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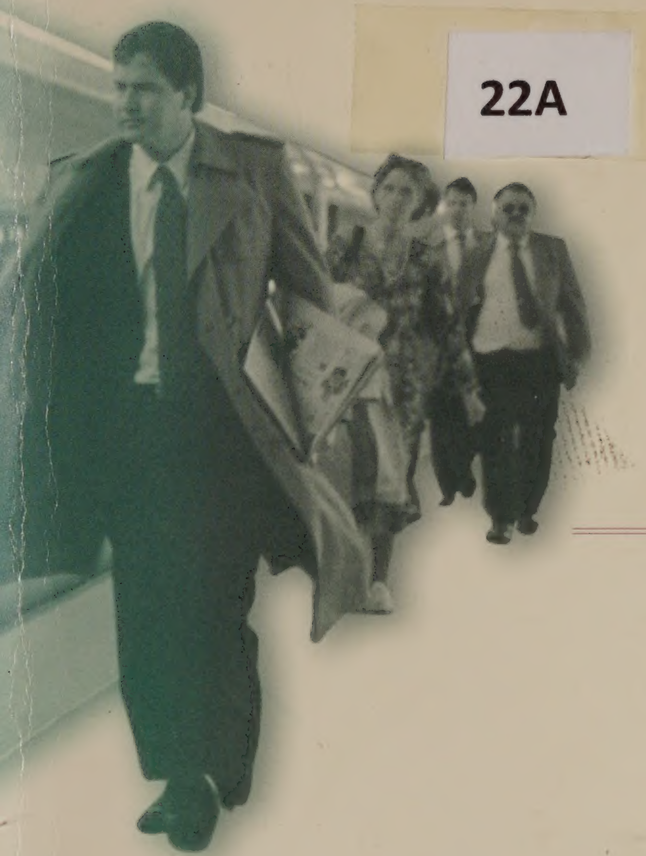

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EOEA# 10509

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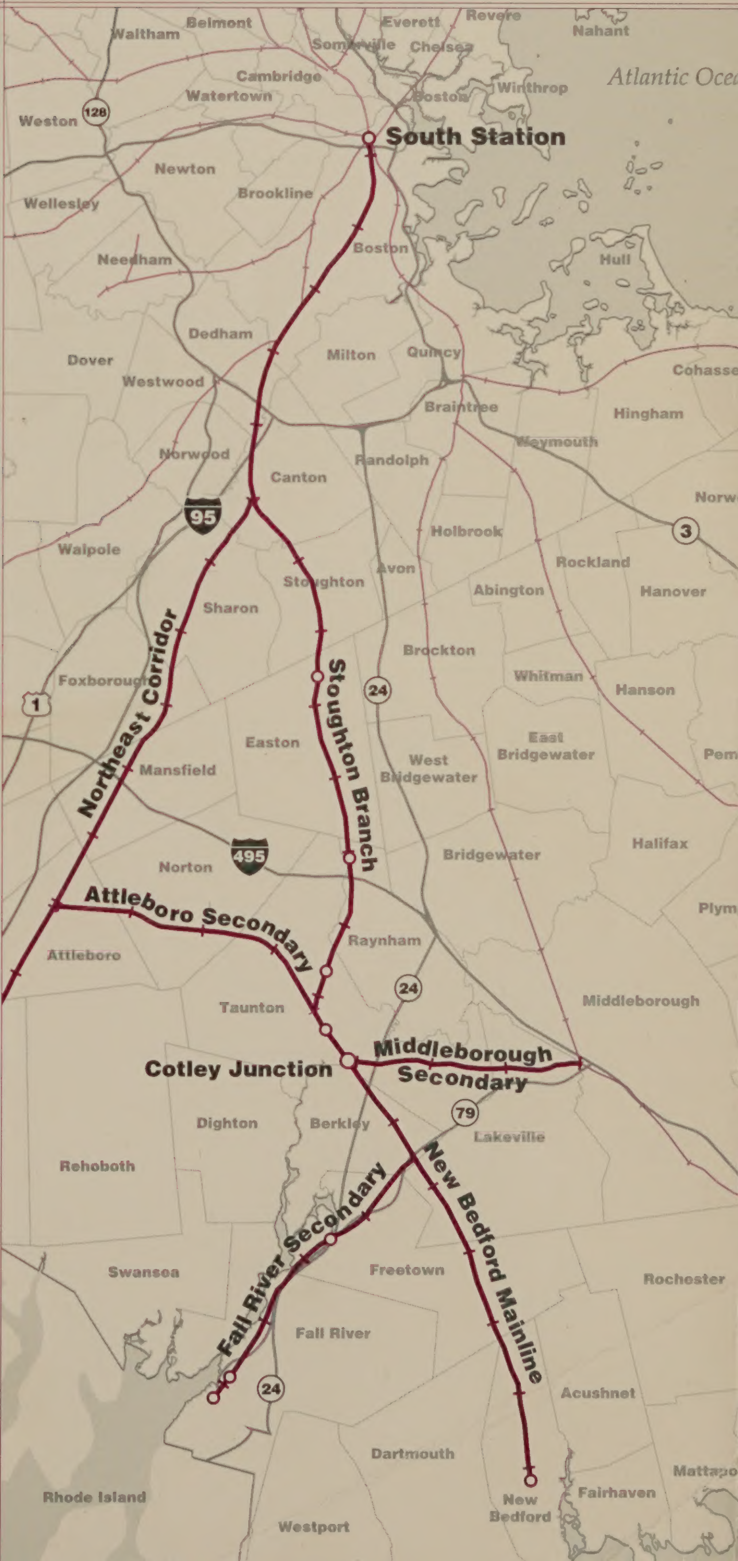

New Bedford/ Fall River

Commuter Rail Extension

July 1999

Submitted by:

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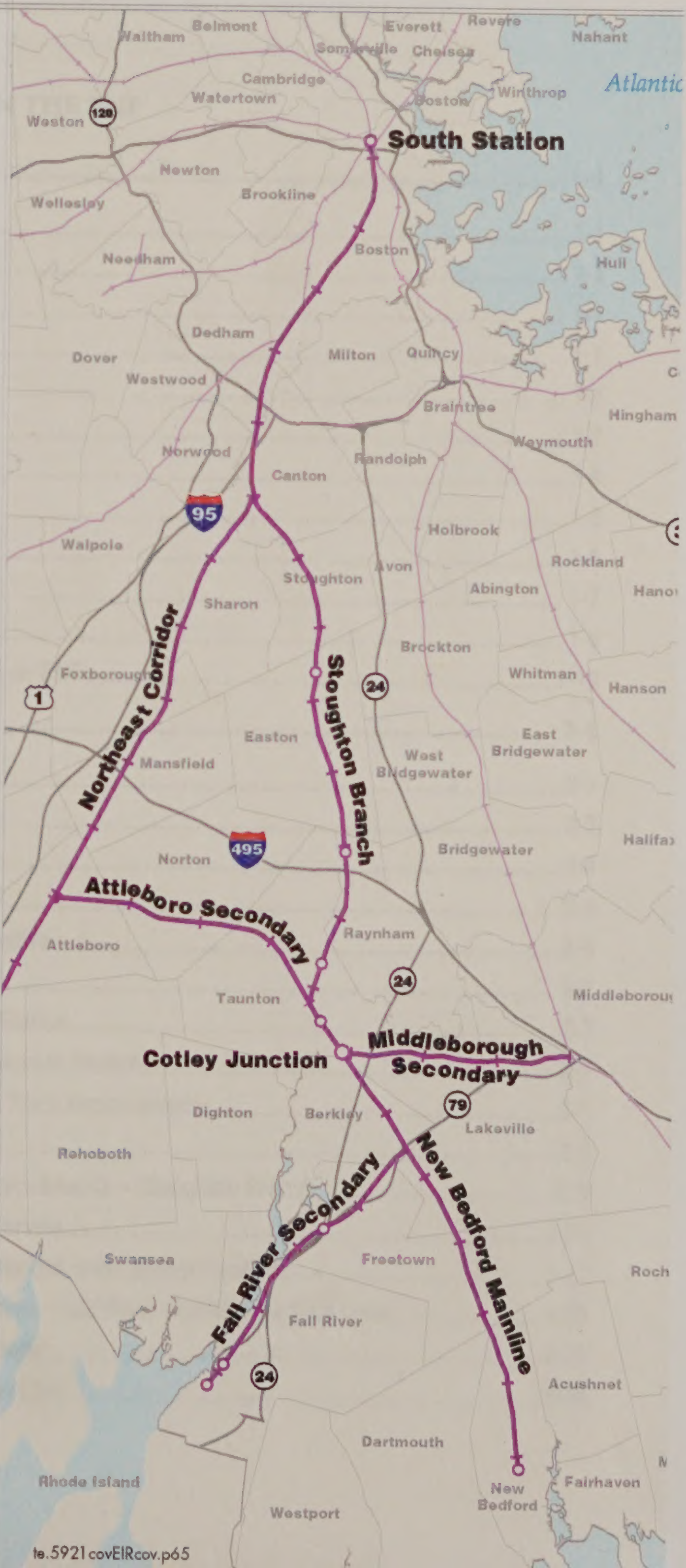

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The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
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December 7, 1995

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS ON THE ENVIRONMENTAL NOTIFICATION FORM

PROJECT NAME : New Bedford/Fall River Commuter Rail Project
PROJECT LOCATION : Statewide
EOEA NUMBER : 10509
PROJECT PROPONENT : MBTA
DATE NOTICED IN MONITOR : October 10, 1995

Pursuant to the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and Sections 11.04 and 11.06 of the MEPA regulations (301 CMR 11.00), I hereby determine that the above project requires the preparation of an Environmental Impact Report.

This project involves the re-establishment of commuter rail service from Boston to New Bedford and Fall River on existing rail lines. It is expected that the re-established service will reduce traffic congestion, reduce vehicle miles traveled, improve air quality, provide alternative transportation infrastructure and provide opportunities for economic growth in southeastern Massachusetts.

The project will consist of three elements: improvements to the existing roadbed including replacement of rails, ballast and ties, creation of passing sidings and improvements to bridges, grade crossings and signals; construction of new stations and layover areas; and construction of a new by-pass section to connect the Shore Line to the Attleborough Secondary. Depending on the ultimate specific design, the by-pass section could alter as much as 5.5 acres of Bordering Vegetated Wetland (BVW) which causes the project to be categorically included for preparation of an Environmental Impact Report (EIR) and to require a variance from the Wetlands Protection Act.

The MBTA filed an Environmental Notification Form that contained considerably more information than MEPA normally receives. This three volume filing addresses many of the issues that would normally be covered in a Draft EIR including screening of alternatives, traffic, wetlands, rare and endangered species, cultural and historic resources, noise and vibration, air quality, and wildlife issues. While this information forms a substantial information base for evaluating the proposed project, there are a number of issues that require further elaboration in the Draft EIR. In addition, the filing stimulated a significant number of thoughtful comments, listed at the end of this Certificate, that must be addressed in the Draft EIR.

The Draft EIR should follow the outline contained at 301 CMR 11.07 and should address the following specific issues.

ALTERNATIVES

Several commenters have questioned whether the preferred Attleborough alternative will have the least environmental impacts and the most benefits, compared to other alternatives, in particular the Middleborough branch of the Old Colony Railroad Restoration project. It appears that the Attleborough alternative may indeed result in more direct impacts, in particular to wetlands. The MBTA has taken the position, however, and submitted documentation to support it, that operational considerations render the Middleborough extension not a feasible alternative and that it would not attract enough ridership.

While minimizing direct impacts is obviously a major concern in this review, the environmental benefits of maximizing ridership have to be considered as well, and may outweigh the impacts. Moreover, if a particular alternative is simply not feasible from an operations perspective, there is no sense in requiring further extensive analysis of that alternative, as some comments have recommended. Resources are better spent on refining design and mitigation for what is feasible.

I ask that the MBTA carefully consider the comments on the ENF, in particular the ones that relate to operational concerns (see below) and ridership potential. If the MBTA remains convinced that the Middleborough alternative is not viable (which should be explained in the EIR), the alternatives analysis can be limited to what is required for purposes of the variance from the Wetlands Protection Act regulations (see below).

As suggested by several commenters, the DEIR should report on the possibility of operating the trains by the "European" method, joining and separating the trains from and to New Bedford and Fall River and operating the combined train from Myricks to Boston. This operating scheme, if it is practicable, would reduce the number of train trips between Myricks and Boston by one half, thereby significantly reducing the disruption to residential neighborhoods and reducing conflicts on the busy Shore Line.

The comment from SRPEDD asks whether the trains scheduled for departure from Lakeville through Old Colony to Boston could be started from New Bedford and Fall River. This would provide up to 17 trains per day utilizing the Middleborough line and the Old Colony line without increasing the traffic projected for the Old Colony line. It seems reasonable to consider this if the minimum service to both Fall River and New Bedford is acceptable.

Furthermore, SRPEDD has requested a train dispatching string line report for both the Attleborough line and the Middleborough line to accurately determine capacities for both. I feel that these analyses are appropriate and expect that they will be included in the DEIR.

WETLANDS

The DEIR shall provide plans at a reasonable scale that show the wetland resources by wetland category to be affected by the proposed Attleborough By-pass. The wetland boundaries should be agreed to by the respective Conservation Commissions and any disputed boundaries should be specifically identified.

The plans shall also identify the specific right-of-way of the new railway, the proposed toe of slope for any embankment sections, any drainage structures through the embankment, and areas to be cleared of vegetation in conjunction with construction or operation of the by-pass, if any.

A narrative should be provided that identifies the cumulative wetland alteration for the by-pass and all means of replicating or otherwise minimizing wetland impacts.

Reconstruction of the existing tracks, construction of stations, and layover sites will need no further wetland review under MEPA since these issues are adequately addressed in the ENF filing and will be subject to separate filings before the Conservation Commissions of the respective towns.

VARIANCE FROM 310 CMR 10.00

The DEIR shall contain a complete request for a variance from the Wetlands Protection Act regulations that shall include a description of alternatives to the proposed project that were explored, including alternative routing, and a thorough explanation of the environmental benefits and detriments of each alternative; a statement of how effective each alternative is in accomplishing the purpose of the project; a description of the mitigation measures to be used to protect the interests identified in M.G.L. c.30, ss. 40; and evidence of the overriding public interest which would justify a waiver of 310 CMR 10.

I trust that this section will be prepared carefully and thoroughly since denial of the variance would render this preferred alternative unusable. Close coordination with the Division of Wetlands and Waterways during development of this information is recommended.

WILDLIFE

The DEIR shall contain the information required by the Natural Heritage & Endangered Species Program to make proper determinations of the potential adverse impacts to the 14 state-listed rare species occurring along the proposed route. Furthermore, the DEIR should identify what means are available to avoid or minimze such impacts and to provide safe and effective wildlife corridors across the right-of-way.

TRAFFIC

As requested by the Massachusetts Highway Department in its comment letter, the DEIR should contain an additional traffic analysis at and surrounding the proposed East Taunton station. The analysis should consider the potential traffic to be generated by the proposed retail development at West Wind Industrial Park.

As requested by the New Bedford Department of Public Works, the DEIR should contain a re-examination of the Tarkiln Hill Road grade crossing that considers the proposed Stop and Shop and the proposed Wampanoag Family Entertainment Center.

The DEIR should also consider the request of the Freetown Planning Board to evaluate traffic impacts at Narrows Road and

South Main Street and, in addition, consider the proposed alternative location for the Freetown station contained in that letter.

AIR QUALITY

Several commentors have expressed concern with NOx increases from the proposed trains. NOx is a precursor to ozone and can create eutrophication problems in water bodies when atmospheric deposition occurs. The DEIR should assess the potential impacts, including eutrophication of sensitive water bodies that may be identified along the route.

HISTORICAL AND ARCHAEOLOGICAL RESOURCES

The DEIR should contain the information required by the Massachusetts Historical Commission (MHC) to make a proper assessment of the potential impacts of the project on archaeological and historic resources. I suggest consultation with MHC regarding specific requirements.

OTHER ISSUES

I received many comments on the impacts to property values, quality of life and other socioeconomic issues, as well as requests for cost/benefit analyses and financial feasibility of the project. While I have no specific authority to require responses to these issues, I recognize that these issues are of importance to persons and entities most affected by this project. I encourage the MBTA to recognize these concerns and respond to the comments to the extent possible.

December 7, 1995
Date

Trudy Coxe, Secretary

Comments received :

Albernay, Jeffrey
Aleo, Brian and Lisa
Amaral, Dennis
Arnold, Adolf & Virginia

+ 3½ pp. more 5
Names

1

Summary

1.1 Project Name

New Bedford/Fall River Commuter Rail Extension Project

1.2 EOEA File Number

EOEA File Number 10509

1.3 Proponent

Massachusetts Bay Transportation Authority
Ten Park Plaza
Boston, MA 02116

1.4 Project Description

The New Bedford/Fall River Commuter Rail Extension project was developed with the ultimate goal of providing a safe, efficient and reliable commuter rail service for southeast Massachusetts, from Boston to the seaport communities of New Bedford and Fall River (Figure 1.4-1). Prior to 1958, these rail lines were part of the Old Colony Railroad System which provided service to these communities from Boston's South Station, via Canton Junction, along the Stoughton Branch railroad. Since discontinuation of this service, commuter rail has only been available to southeastern Massachusetts along the Boston-Providence Shore Line, with stops in Attleboro and South Attleboro, and the Old Colony Middleborough Line which terminates in Lakeville. However, none of these projects provide an opportunity for commuters from the Fall River or New Bedford areas to easily or efficiently access rail transportation to Boston. Several southeast Massachusetts communities and agencies have proposed re-establishing commuter rail service to relieve traffic congestion, improve transportation infrastructure, and stimulate economic growth through an improved and reliable public transportation system linking major metropolitan areas. In July 1995, Governor Weld made a commitment to provide commuter rail service to New Bedford and Fall River. This commitment continues with the Cellucci Administration.

The project will provide commuter rail service from Boston's South Station to New Bedford and Fall River. The Stoughton Alternative, presented in this Draft EIR as the MBTA's preferred transportation alternative, includes stops at the existing Back Bay, Canton Junction, and Stoughton stations, and at new stations located in North Easton, Raynham, Taunton (Dean Street), East Taunton, Freetown, Fall River, Battleship Cove (Fall River), and New Bedford. Layover facilities would be constructed in New Bedford, as described in the ENF, although the proposed Fall River layover facility would be relocated. The MBTA is currently investigating alternative sites for this facility. This alternative would use existing commuter rail tracks from South Station to the Stoughton Station; would require the reconstruction of 14 miles of commuter rail along an inactive rail right-of-way from Stoughton to north of Winter Street in Taunton (including acquiring the disused right-of-way from 17 current private property owners); and would use 2 miles of active freight rail lines from Winter Street to Ingell Street in Taunton. Upgrading and rehabilitating existing active freight track from Ingell Street (Weir Junction) to the terminal stations in Fall River and New Bedford will be required, as described in the ENF. Figure 1.4-2 describes the current ownership of the existing and proposed rail corridors for each alternative.

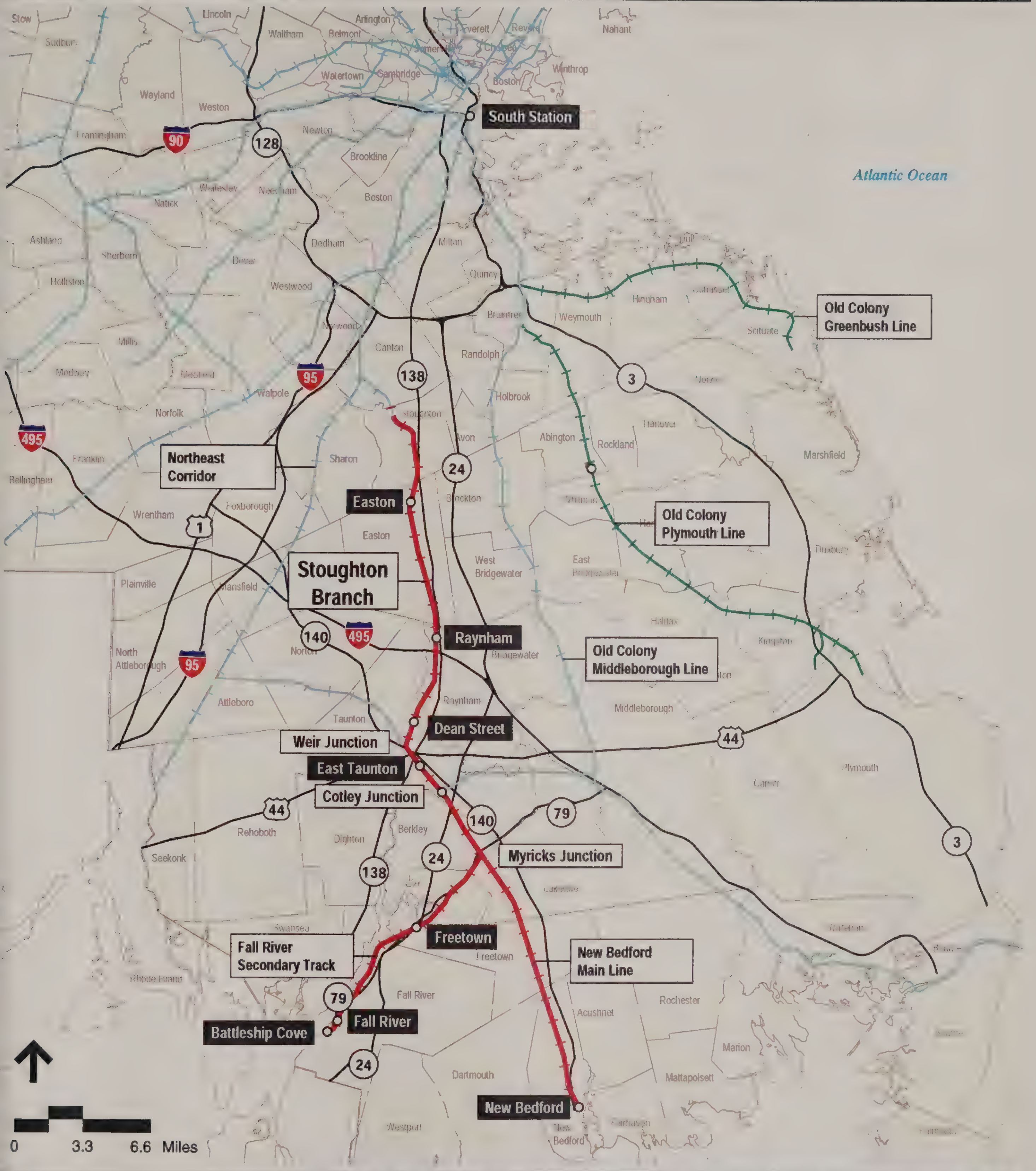
The Stoughton Alternative is projected to serve 4,325 commuter rail patrons per day, with 20 daily round-trips to Fall River and to 20 daily round trips to New Bedford. The estimated travel time from New Bedford to South Station is 1 hour and 20 minutes.

1.5 Project Benefits

The re-establishment of commuter rail service will relieve traffic congestion, reduce vehicle miles traveled, and improve transportation infrastructure and air quality. Efficient commuter rail service between Boston, Taunton, New Bedford, and Fall River will improve access to jobs and tourist attractions, and is likely to have additional economic benefits in these southeastern Massachusetts communities by increasing residential and commercial property values.

1.6 Project History

An Expanded Environmental Notification Form (ENF) was submitted to the Executive Office of Environmental Affairs in September, 1995. This ENF provided a detailed evaluation of the environmental impacts, infrastructure improvements, commuter rail stations, layover facilities and operations of the New Bedford/Fall River Commuter Rail system. The ENF also provided a summary of the alternatives te\05921\graphics\figures\5921-G3.dwg 07/15/99



New Bedford / Fall River Commuter Rail

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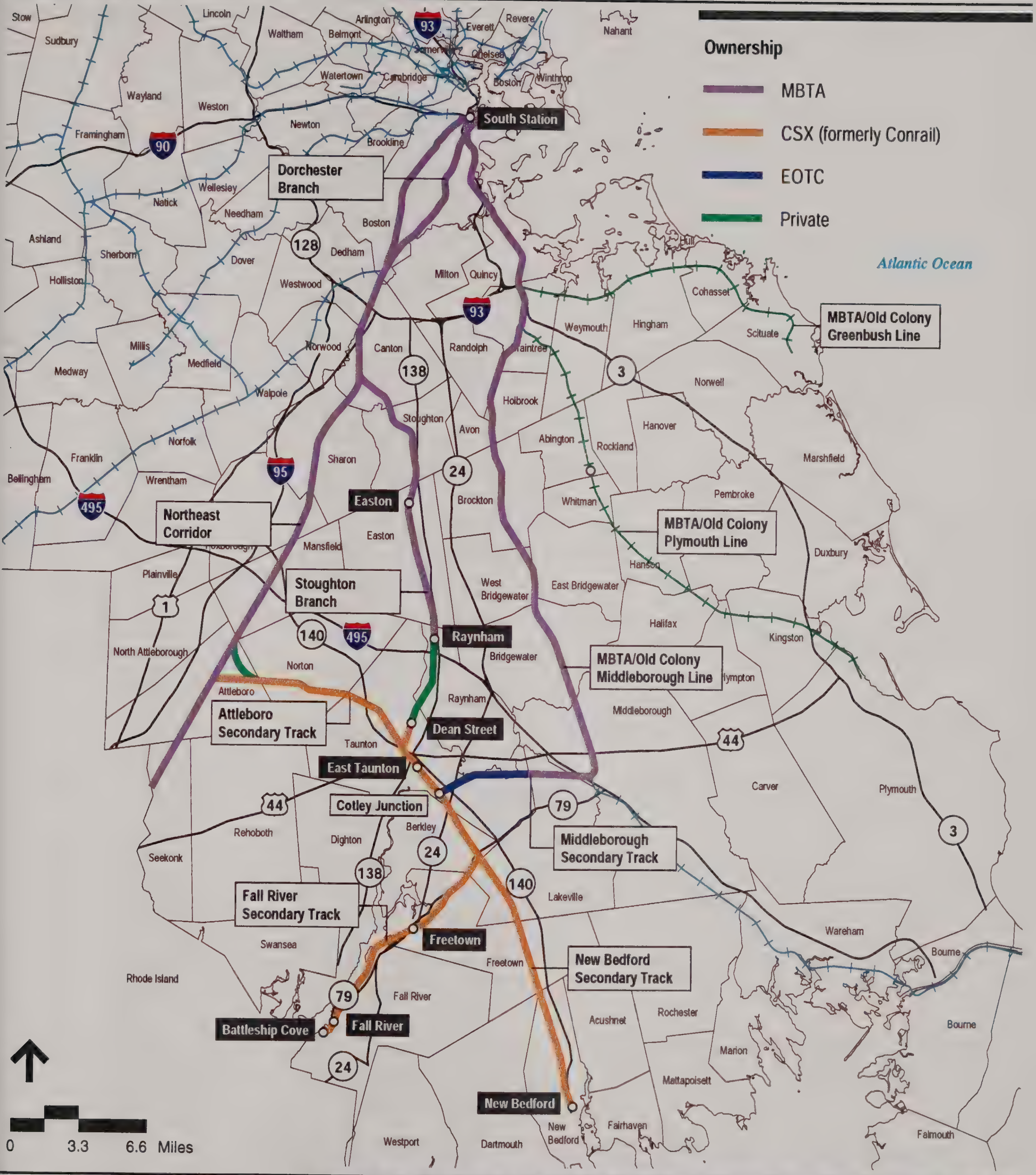
Project Overview
Stoughton Alternative

Figure 1.4-1



New Bedford / Fall River Commuter Rail

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Project Ownership

Figure 1.4-2

analyzed in the MBTA's 1990 and 1995 feasibility reports, and identified the Attleboro Alternative as the MBTA's preferred alternative. The ENF proposed a special review process that would require preparation and submittal of a Draft and Final Environmental Impact Report for the construction of commuter rail along a new alignment in Attleboro and that would respond to comments on the ENF, but that would not require further MEPA review of improvements to the existing rail infrastructure or station construction other than information required to respond to comments.

The Secretary's Certificate on the ENF, issued on December 7, 1995, found that the ENF "forms a substantial base for evaluating the proposed project [but] there are a number of issues that require further elaboration in the Draft EIR." Specific requirements for this DEIR included:

- Additional analysis of alternatives, particularly to determine if the Middleborough Alternative is practicable, or if operational or equipment alternatives could reduce the number of trips between Myricks and Boston to reduce impacts on residential neighborhoods and operations of the Shore Line.
- No further MEPA wetland review was required for the reconstruction of existing tracks, construction of stations, or construction of layover facilities. The Secretary determined that these issues were adequately addressed in the ENF and would be the subject of Conservation Commission filings.
- Additional information and detail on the construction of new railroad through wetlands, with respect to wetland impacts, vegetation clearing, and mitigation;
- A complete request for a Variance, including analysis of alternatives, explanation of environmental benefits and detriments of each, and detailed information on mitigation;
- Information required by the Massachusetts Natural Heritage and Endangered Species program to determine adverse impacts to state-listed rare species, avoidance or minimization of impacts, and provision of wildlife corridors;
- Additional traffic analysis for the East Taunton station; the Tarkiln Road crossing in New Bedford; and traffic impacts and alternative station locations in Freetown;
- Potential water quality impacts of increased nitrogen oxide (Nox) emissions; and
- Information required by the Massachusetts Historic Commission to assess potential impacts to historic resources.

In addition, the Secretary requested that the MBTA consider impacts to property values, quality of life, and socioeconomic issues, as well as the cost/benefit and financial feasibility of providing commuter rail service to New Bedford and Fall River.

Due to public concerns received during the ENF, in 1996, the Massachusetts State Legislature directed the MBTA to prepare an Expanded Feasibility Study, which evaluated all viable alternative routes for extending commuter rail service to both New Bedford and Fall River via the Attleboro, Stoughton and Middleborough railroad corridors. The report concluded that the Stoughton Alternative would attract the highest ridership, have the least environmental impacts and represent the most cost-effective commuter rail alternative. As a result, the MBTA is currently preparing a Draft Environmental Impact Report (DEIR) which compares the Attleboro Line and the Stoughton Line and undertaking 10 percent preliminary engineering design for the Stoughton alignment to adequately compare both alternatives. The Middleborough Line alternative is not considered to be a viable alternative due to low ridership, increased travel time and operational constraints on the Old Colony Main Line north of Braintree, based on the 1997 *Expanded Feasibility Study*.

The MEPA Certificate and the State Legislature recognize that minimal impacts occur South of Cotley Junction in Taunton, therefore, the MBTA was directed to proceed with final design activities. As part of the design efforts for the project, the design team has recently completed the South Coast Bridge Contract. It was bid and awarded in September 1998, and is currently under construction. This one-year construction contract involves the complete replacement of four bridge superstructures which are owned by CSX (formerly Conrail) and the rehabilitation of one state highway bridge on the Fall River Secondary Track. The MBTA is currently completing final design for the replacement of three bridges in New Bedford. This contract is expected to be bid in late fall, 1999.

1.7 Alternatives

The MBTA has conducted several other feasibility studies (1990, 1995, 1997) to determine if the extension of commuter rail service to New Bedford and Fall River is feasible, and to determine which of the alternative routes or modes would be feasible from a cost and operations perspective, and would serve the largest number of commuters.

The MBTA conducted an initial feasibility study in 1990. This study recommended that service be extended from Canton Junction along the Stoughton Branch to New Bedford and Fall River. Five alternatives, in addition to an express bus service, were analyzed. In response to comments in 1991 by the Joint Transportation Planning Group of the Southeastern Massachusetts Municipal Planning Organization, the MBTA revised and expanded the feasibility study and, in May 1995, released an expanded feasibility study. This Expanded Feasibility Study identified the Attleboro Alternative as the MBTA's preferred alternative.

In August, 1996 the Massachusetts State Legislature directed the MBTA to further study all viable alternatives for extending commuter rail service to both New Bedford and Fall River. The Expanded Alternatives Analysis was completed in March, 1997, and provided a comparison of 8 alternatives based on ridership, cost, and operational logistics (Table 1.7-1). This analysis concluded that the Attleboro and Stoughton routes were the only options that would attract ridership levels comparable to those found on existing MBTA commuter rail lines. The following table summarizes the alternatives examined in these feasibility studies. Chapter 3 of this Draft EIR provides additional detailed information on each alternative.

Table 1.7-1
Summary of Alternatives

Alternative	Daily Inbound Ridership	Total Annualized Cost ($millions)*	Cost per New Rider** ($million)	Summary of Analysis
Attleboro	3,230	$62.60	$0.19	Meets project objectives with respect to transportation benefits and cost effectiveness
Attleboro with DMU Service***	2,970	$60.90	$0.21	Not feasible: DMUs have not been approved for use in the United States.
Middleborough	1,320	$34.00	$0.29	Not feasible due to operational constraints: low ridership: does not meet project transportation objectives: not cost-effective
Middleborough with shuttle/transfer	2,045	$55.20	$0.27	Not feasible due to operational constraints: low ridership: does not meet project transportation objectives: not cost-effective
Middleborough with relocated Lakeville Station	1,410	$34.80	$0.29	Not feasible due to operational constraints: low ridership: does not meet project transportation objectives: not cost-effective
Middleborough with relocated Lakeville Station and shuttle/transfer	2,030	$39.60	$0.19	Not feasible due to operational constraints: low ridership: does not meet project transportation objectives: not cost-effective
Stoughton	4,325	$59.60	$0.13	Meets project objectives with respect to transportation benefits and cost-effectiveness
Stoughton with DMU Service	4,360	$61.50	$0.14	Not feasible: DMUs have not been approved for use in the United States.
Enhanced Bus Service	3,890	$4.80	$0.01	Partially meets project objectives: requires modifications to South Station bus facility

* Includes design, administration, contingencies, equipment, operations and construction

** Total capital cost (infrastructure + equipment) divided by the number of new transit riders

*** DMU (diesel multiple units) would use self-propelled rail cars that can operate in pairs or in larger consists. Small trains from New Bedford and Fall River would be linked at Myricks Junction or the East Taunton Station.

1.8 Permits and Approvals

The New Bedford/Fall River Commuter Rail extension will require permits and approvals from several state and federal agencies. Table 1.8-1, below, lists the permits and approvals that are anticipated.

Table 1.8-1
Permits and Approvals

Permit/Approval	Agency
MA Wetlands Protection Act Variance	MA DEP
Order of Conditions	Stoughton Conservation Commission Easton Conservation Commission Raynham Conservation Commission Taunton Conservation Commission Freetown Conservation Commission Lakeville Conservation Commission New Bedford Conservation Commission Fall River Conservation Commission
Sect. 401 Water Quality Certification	MA DEP
Section 404 Permit	US Army Corps of Engineers
Massachusetts Endangered Species Act – Conservation Permit	MA Division of Fisheries, Wildlife and Law Enforcement
Coastal Zone Management Consistency Review	MA CZM
NPDES Construction Permit	US EPA
Massachusetts Historic Act Review	Massachusetts Historic Commission
National Historic Preservation Act (Section 106) Review	Massachusetts Historic Commission
Chapter 91 License	MA DEP

1.9 Summary of DEIR

This Draft Environmental Impact Report (DEIR) was prepared in compliance with the Massachusetts Environmental Policy Act (MEPA) and its implementing regulations at 301 CMR 11.07. It contains a description of the project, an analysis of alternatives, as well as description of the existing environment, an assessment of impacts, and a description of mitigation measures. The Draft EIR also contains a draft Section 61 Finding for the agency actions to be taken on the project, and responds to all comments received in response to the 1995 Expanded Environmental Notification Form (ENF).

The ENF presented detailed information on the Attleboro Alternative, identified as the MBTA's preferred alternative. Subsequently, as a result of comments on the ENF, subsequent findings in the alternatives analysis reports and an analysis of alternatives undertaken for the wetland variance, the MBTA has identified the Stoughton Alternative as the preferred transportation alternative. The Stoughton Alternative would best meet the project objectives by providing the highest ridership and the lowest cost per new rider, and would result in the loss of less wetland area than the Attleboro Alternative. This Draft EIR, therefore, presents a description and analysis of the Stoughton Alternative at the same level of detail as was provided in the ENF on the Attleboro Alternative. This information will allow the MBTA, and state permitting agencies, to make decisions on actions required to re-establish commuter rail service to New Bedford and Fall River.

The DEIR is organized into the following chapters:

- Chapter 2 provides detailed descriptions of the project elements
- Chapter 3 provides a comparative analysis of the alternatives
- Chapter 4 provides information on the existing environment, impacts and mitigation measures, including:
  - Wetlands
  - Water quality
  - Biological diversity
  - Area of Critical Environmental Concern
  - Traffic
  - Air quality
  - Noise and vibration
  - Historic and archaeological resources
  - Hazardous materials
- Chapter 5 provides a draft Request for a Wetlands Variance
- Chapter 6 provides a statement of the project's consistency with Coastal Zone Management policies
- Chapter 7 contains the draft Section 61 Finding
- Chapter 8 provides the distribution list for the DEIR
- Chapter 9 contains the comment letters and responses to comments on the ENF

Technical appendices include operations analyses, the 1997 Expanded Feasibility Analysis, and technical appendices to support the air quality and noise analyses. Detailed supporting data for the traffic and grade crossing analyses are available on request.

1.10 Summary of Impacts

This section provides a summary of the environmental impacts of the New Bedford/Fall River Commuter Rail Extension, and contrasts the environmental effects of the Stoughton and Attleboro Alternatives based on information provided in the ENF and this DEIR.

As Table 1.10-1 demonstrates, the Stoughton Alternative would have equivalent or less impact with respect to the majority of environmental and social resources. The Stoughton Alternative would have, fewer air emissions and greater air quality benefits, fewer noise and vibration impacts, fewer potential impacts to historic structures, and less loss of bordering vegetated wetland. This alternative would result in more loss of bank and floodplain, greater impacts to rare species, and may have more substantial indirect impacts to wildlife habitat in wetland areas.

Table 1.10-1
Summary of Impacts

Resource Affected	Stoughton Alternative	Attleboro Alternative
Air Quality (kg/day)		
CO Emission Reductions	99	73
VOC Emission Reductions	1777	722
Nox Emission Increases	838	1408
Noise Impacts (number)		
Moderate Impacts	400	587
Severe Impacts	147	258
Vibration Impacts (number)	232	245
At-Grade Crossings	39	40
Wetlands		
Wetland Loss (acres)	2.46	5.7
Bank Loss (linear feet)	2560	580
Bordering Land Subject to Flooding (ac)	0.56	0
Cultural Resources		
Historic Structures potentially affected	3	4
Archaeological Sites/Sensitive Areas	None	none
Rare Species Habitat Loss	3 species	None
Hazardous Materials (sites requiring further investigation)	4 stations	3 stations
Property Acquisition (acres)	72.9	58.4

1.11 Summary of Mitigation

The MBTA is committed to providing mitigation, where practicable, to mitigate or compensate for unavoidable impacts. Table 1.11-1, below, outlines the MBTA's mitigation commitments as described in this DEIR. Specific mitigation measures and an implementation schedule, will be determined and designed during subsequent design process and will be identified in the Final EIR.

Table 1.11-1
Mitigation Measures

Impact Type	Mitigation Commitment
Wetland impacts	Provide full compensatory mitigation for all loss of wetland area; provide mitigation for loss of wetland functions
Water Quality	Utilize appropriate BMPs for construction erosion and sedimentation control Implement spill control program during construction Use approved vegetation management plan for ROW maintenance Design and operate stations in compliance with DEP Stormwater Policy
Wildlife/Rare Species	Provide wildlife underpasses/tunnels as practicable Prepare conservation plans for affected rare species, to minimize impacts and provide long-term net benefits to the local populations
Traffic	Improve intersections of Route 138 in Easton at Main Street, Route 123, Union Street, and Elm Street Improve intersection of Route 138 and Foundry Street in Raynham Improve intersection of Ridge Hill Road and South Main Street in Freetown Improve intersections affected by the Fall River and New Bedford stations
Noise and Vibration	Develop noise mitigation implementation plan: implement noise barriers, soundproofing, and vibration isolation/absorbing devices as practicable
Historical Properties	Monitor and mitigation potential vibration impacts at North Easton Old Colony Station
Hazardous Materials	Conduct Phase I Site Assessment at Raynham and Dean Street Stations: remediate contaminated areas as appropriate
Safety	Install and maintain best available grade crossing protection and warning devices Implement Operation Lifesaver safety training and education programs in local schools and communities Construct bypass roadway in Stoughton south of Morton Street to protect safe driveway access Implement regular MBTA police helicopter patrols of the right-of-way

1.12 Summary of Comments on ENF

The MBTA received 115 comment letters in response to the ENF. These comments are addressed in the DEIR text and in Chapter 9, Responses to Comments. Comments were made in regard to several major issues:

- Safety, particularly with respect to grade crossings and emergency response
- Alternatives analysis and justification of the selection of the Attleboro Alternative
- Traffic impacts
- Wetland impacts
- Air quality
- Noise
- Planning, and the relationship of this project to other projects in the region
- Community impacts, including quality of life and property values

2

Project Description

This chapter provides a description of the proposed project, its purpose and history, and detailed descriptions of each of the project elements.

2.1 Overview

The New Bedford/Fall River Commuter Rail Extension Project was developed with the ultimate goal of providing a safe, efficient and reliable commuter rail service for southeastern Massachusetts, from Boston to the seaport communities of New Bedford and Fall River. Prior to 1958, the Old Colony Railroad System Network provided service to these communities from Boston's South Station, via Canton Junction, along the Stoughton Branch. Since discontinuation of this service, commuter rail has only been available to southeastern Massachusetts along the Boston-Providence Shore Line, with stops in Attleboro and South Attleboro, and the Old Colony Middleborough Line has recently restored commuter rail service to Lakeville. However, none of these projects provide an opportunity for commuters from the Fall River or New Bedford areas to easily and efficiently access rail transportation to Boston. Several southeastern Massachusetts communities have proposed re-establishing commuter rail service to relieve traffic congestion, improve transportation infrastructure, and stimulate economic growth through an improved and reliable public transportation system linking major metropolitan areas. In July 1995, the Weld/Cellucci Administration committed to re-establish commuter rail service between Boston and New Bedford and Fall River.

The Stoughton Branch Alternative, presented in this Draft EIR as the MBTA's preferred alternative (see Figure 2.1-1), is an extension of the existing Stoughton Line service. Stations sites includes stops at the existing Back Bay, Canton Junction, and Stoughton stations, and eight new station stops located in North Easton, Raynham, Dean Street (Taunton), East Taunton, Freetown, Fall River, Battleship Cove (Fall River) and New Bedford. Layover facilities would be constructed in New Bedford, as described in the ENF, and were proposed in Fall River. The MBTA is currently investigating alternative sites for the relocation of the Fall River layover facility to Freetown. This alternative would use existing active commuter rail tracks from South Station to the Stoughton Station. South of Stoughton Station, this would require the reconstruction of 14 miles of currently inactive track right-of-way from Brock Street, Stoughton to north of Winter Street in Taunton, and 2 miles of active freight track, south of Winter Street to Ingell Street (Weir Junction). The upgrading and rehabilitation of existing active freight rail lines from Weir Junction in Taunton to the terminal stations in Fall River and New Bedford will also be required.

The Stoughton Alternative is projected to serve 4,325 commuter rail patrons per day, with 20 daily round-trips to Fall River and to New Bedford. The estimated travel time from New Bedford to South Station is 1 hour and 15 minutes.

The following paragraphs and Table 2.1-1 describe segments of the New Bedford/Fall River Commuter Rail Extension utilizing the Stoughton Branch Alternative:

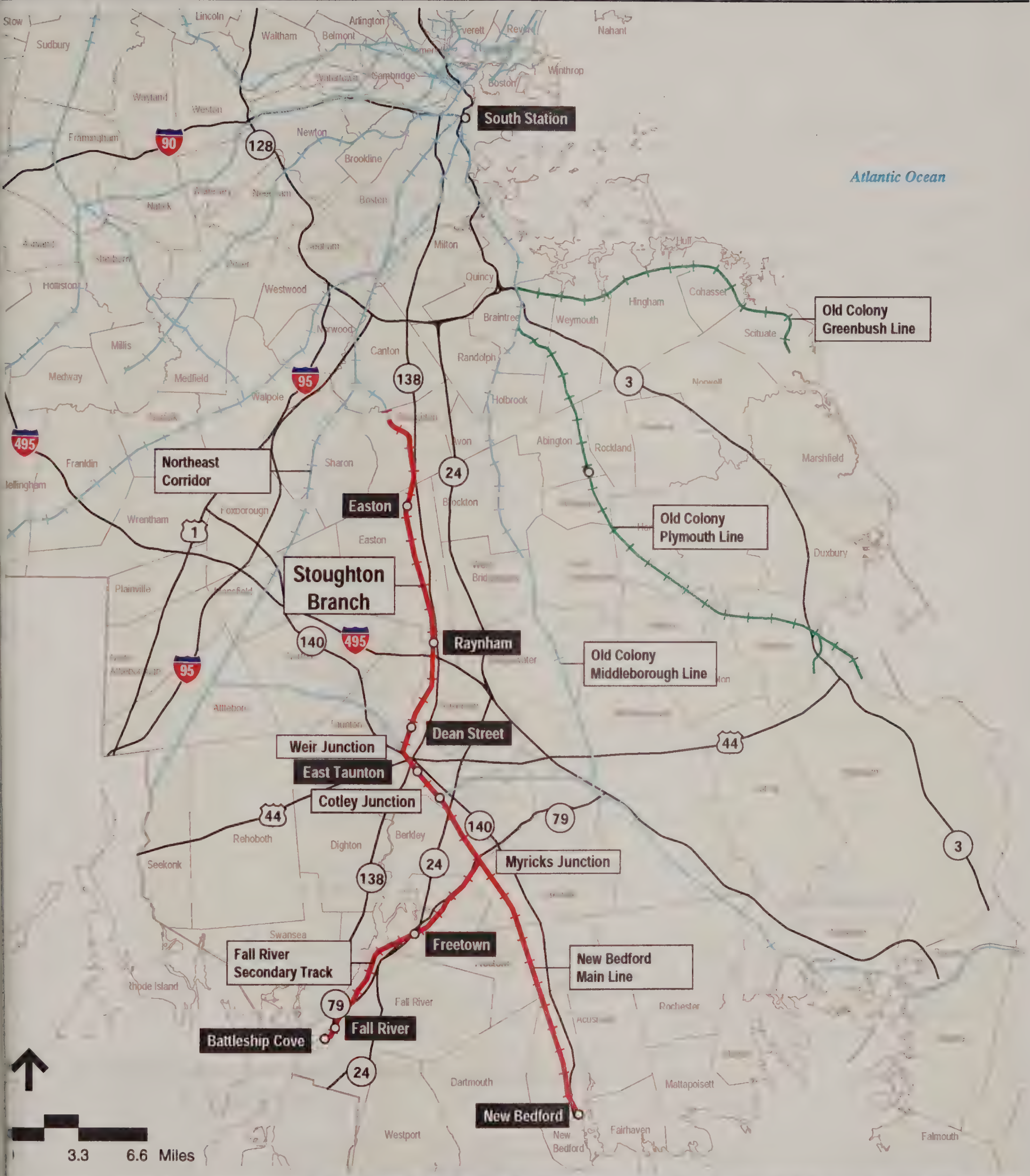
Boston to Stoughton - New Bedford/Fall River Commuter Rail service will originate at South Station. Trains will use the existing Shore Line stopping at Back Bay Station as they travel to Canton Junction, and the existing Stoughton Line to Stoughton Station. This portion of the project is currently in use for commuter rail service, and will not require any new work or approvals.

Stoughton to Taunton: The existing but inactive Stoughton Branch, from Brock Street in Stoughton to Weir Junction (Ingell Street) in Taunton (16 miles) will require substantial reconstruction of track, signals, bridges, and grade crossings, although active freight service exists south of Winter Street in Taunton to Ingell Street (2 miles). The total track distance for the Stoughton Branch is 16 miles. Train service from Brock Street south to Winter Street was discontinued in 1958, and much of the track was subsequently removed. Bridges conveying several local roads above the railroad (Main Street in North Easton, Thrasher Street in Taunton) have been filled in, blocking the railroad right-of-way. There are a total of 26 existing at-grade crossings, (18 public and 8 private) between Brock Street and Weir Junction. Of the 26 at-grade crossings, 17 crossings will remain open and be improved for safety. New stations will be constructed in North Easton at the Stoughton/Easton town line, and in Raynham adjacent to the Raynham-Taunton Greyhound Park. Reconstruction of the rail line will include creating a grade-separated intersection at Route 138 in Raynham to improve safety and reduce traffic congestion.

A new station will be constructed north of Dean Street to serve Taunton residents. Realignment of the track at Weir Junction will be necessary to safely and efficiently accommodate the needs of existing freight service and uninterrupted commuter rail service along this section of track.

Weir Junction (Taunton) to New Bedford and Fall River - south of Weir Junction the project will progress through Cotley Junction to Myricks Junction where the New Bedford Main Line and the Fall River service diverge and extend towards the dual terminals. All of these portions of the project were previously described and addressed in the ENF, with the exception of minor modifications at Cotley Junction and along the New Bedford and Fall River lines described in Sections 2.4.4 and 2.6 of this DEIR.

The track segments within this section are all actively used for freight service, and are referred to as the Attleboro Secondary (extending from Weir Junction to Cotley Junction in East Taunton), the New Bedford Main Line (extending from Cotley



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Commuter Rail Project
Stoughton Alternative

Figure 2.1-1

Junction to New Bedford), and the Fall River Secondary (extending from Myricks Junction in Lakeville to Fall River). The Attleboro Secondary is owned by the Executive Office of Transportation and Construction (EOTC), while the New Bedford and Fall River lines are owned by CSX (formerly Conrail). The track infrastructure condition varies, but no portions of these lines are in acceptable condition for commuter rail service at required operating speeds. Infrastructure improvements, consisting of track, tie, ballast, grade crossing, bridge, and signals improvements are required for reinstated operation.

Table 2.1-1
Summary of Project Segments

Segment	Length	Work Required	Stations
South Station to Stoughton Station	14.8 miles	No work required	No new stations
Stoughton Station to Thrasher Street	14.19 miles	Reconstruction of inactive right-of-way, bridges, crossings, and signals: grade separation at Route 138	North Easton Raynham
Winter Street to Weir Junction (Ingell Street)	1.58 miles	Reconstruction of existing track, signals, crossings, and bridges	Dean Street
Weir Junction to Cotley Junction	1.56 miles	Reconstruction of existing track, signals, crossings and bridges	East Taunton
Cotley Junction to Myricks Junction	3.36 miles	Reconstruction of existing track, signals, crossings and bridges	None
Myricks Junction to Fall River	12.15 miles	Reconstruction of existing track, signals, crossings and bridges	Freetown Fall River Battleship Cove
Myricks Junction to New Bedford	14.55 miles	Reconstruction of existing track, signals, crossings and bridges	New Bedford

2.2 Project Purpose

The re-establishment of commuter rail service will relieve traffic congestion, reduce vehicle miles traveled, and improve transportation infrastructure and air quality. Efficient commuter rail service between Boston, Taunton, New Bedford, and Fall River will improve access to jobs and tourist attractions, and may, by virtue of being better linked to the rest of the commonwealth, have additional economic benefits in these southeastern Massachusetts communities.

2.3 Project History

In 1958, commuter rail service to New Bedford and Fall River was terminated because of the growing popularity of the automobile. For over 10 years, the state and the MBTA have contemplated restoring commuter rail service commuter rail service to the Southeastern Massachusetts communities of New Bedford, Fall River and Taunton.

The MBTA has conducted several feasibility studies to determine if the extension of commuter rail service to New Bedford and Fall River is feasible, and to determine which of the alternative routes or modes would be feasible from a new transit ridership capture, cost and operations perspective, and would serve the largest number of commuters.

The MBTA conducted an initial feasibility study in 1990. This study recommended that service be extended from Canton Junction along the Stoughton Branch to New Bedford and Fall River. Five alternatives, in addition to an express bus service, were analyzed. In response to comments on the 1990 feasibility study by the Joint Transportation Planning Group of the Southeastern Massachusetts Municipal Planning Organization, the MBTA revised and expanded the feasibility study.

In May 1995, the MBTA released a New Bedford/Fall River Expanded Feasibility Study. This Expanded Feasibility Study identified the Attleboro Alternative as the MBTA's preferred alternative. The Expanded Environmental Notification Form (ENF) was submitted to the Executive Office of Environmental Affairs in September 1995. This ENF provided a detailed evaluation of the infrastructure improvements, commuter rail stations, and operations of the New Bedford/Fall River Commuter Rail system. The ENF also provided a summary of the alternatives analyzed in the MBTA's 1990 and 1995 feasibility reports, and identified the Attleboro Alternative as the MBTA's preferred alternative. The ENF proposed a special review process that would require preparation and submittal of a Draft and Final Environmental Impact Report for the construction of commuter rail along a new alignment in Attleboro and that would respond to comments on the ENF, but that would not require further MEPA review of improvements to the existing rail infrastructure or station construction other than information required to respond to comments.

The Secretary of Environmental Affairs' Certificate on the ENF, issued on December 7, 1995, found that the ENF "forms a substantial base for evaluating the proposed project [but] there are a number of issues that require further elaboration in the Draft EIR." Specific requirements included:

- ➢ Additional analysis of alternatives, particularly to determine if the Middleborough Alternative is practicable, or if operational or equipment alternatives could reduce the number of trips between Myricks and Boston in order to reduce impacts on residential neighborhoods and operations of the Shore Line.

- No further MEPA wetland review was required for the reconstruction of existing tracks, construction of stations, or construction of layover facilities along the Attleboro Alternative. The Secretary determined that these issues were adequately addressed in the ENF and would be the subject of Conservation Commission filings.
- Additional information and detail on the construction of new railroad through wetlands, with respect to wetland impacts, vegetation clearing, and mitigation;
- A complete request for a Wetland Variance, including analysis of alternatives, explanation of environmental benefits and detriments of each, and detailed information on mitigation;
- Information required by the Massachusetts Natural Heritage and Endangered Species program to determine adverse impacts to state-listed rare species, avoidance or minimization of impacts, and provision of wildlife corridors;
- Additional traffic analysis for the East Taunton station; the Tarkiln Road crossing in New Bedford; and traffic impacts and alternative station locations in Freetown;
- Potential water quality impacts of increased Nitrogen oxide (NOx) emissions; and
- Information required by the Massachusetts Historic Commission to assess potential impacts to historic resources.

In addition, the Secretary requested that the MBTA consider impacts to property values, quality of life, and socioeconomic issues, as well as the cost/benefit and financial feasibility of providing commuter rail service between Boston and New Bedford and Fall River.

The December 7, 1995, MEPA Certificate and the State Legislature recognized that minimal impacts occur South of Cotley Junction (Taunton), therefore, the MBTA was directed by the State Legislature parties to proceed with final design activities. As part of the recent design efforts for the project, the design team has recently completed its first contract - the South Coast Bridge Contract. It was bid and awarded in September 1998, and is currently under construction. This one-year construction contract involves the complete replacement of four bridge superstructures which are owned by CSX and the rehabilitation of one state highway bridge on the Fall River Secondary Track. The MBTA is currently completing final design for the replacement of three bridges in New Bedford. The contract for this work is expected to be bid for construction in late fall, 1999.

Due to public comments received during the ENF response period, in August 1996 the Massachusetts State Legislature directed the MBTA to further study all viable alternatives for extending commuter rail service to both New Bedford and Fall River. The Expanded Alternatives Analysis was completed in March 1997, and provided a comparison of all alternatives based on ridership, cost, and operational logistics. This analysis concluded that the Attleboro and Stoughton routes were the only options that would attract ridership levels comparable to those found on existing MBTA commuter rail lines.

The Middleborough Line alternative was considered but discarded as a viable alternative since low ridership and increased travel time and operational constraints on the Old Colony Main Line north of Braintree prohibits this alternative. As a result, the MBTA has prepared this Draft Environmental Impact Report (DEIR) which compares the Attleboro Line and the Stoughton Line based on the 10 percent preliminary engineering design for the Stoughton alignment (which already exists for the Attleboro Alternative (1995 ENF)) to adequately compare both alternatives. Figures 2.3-1 and 2.3-2 illustrate the Stoughton Alternative. Figures 2.3-3 and 2.3-4 illustrate the Attleboro Bypass.

2.4 Changes Since the ENF

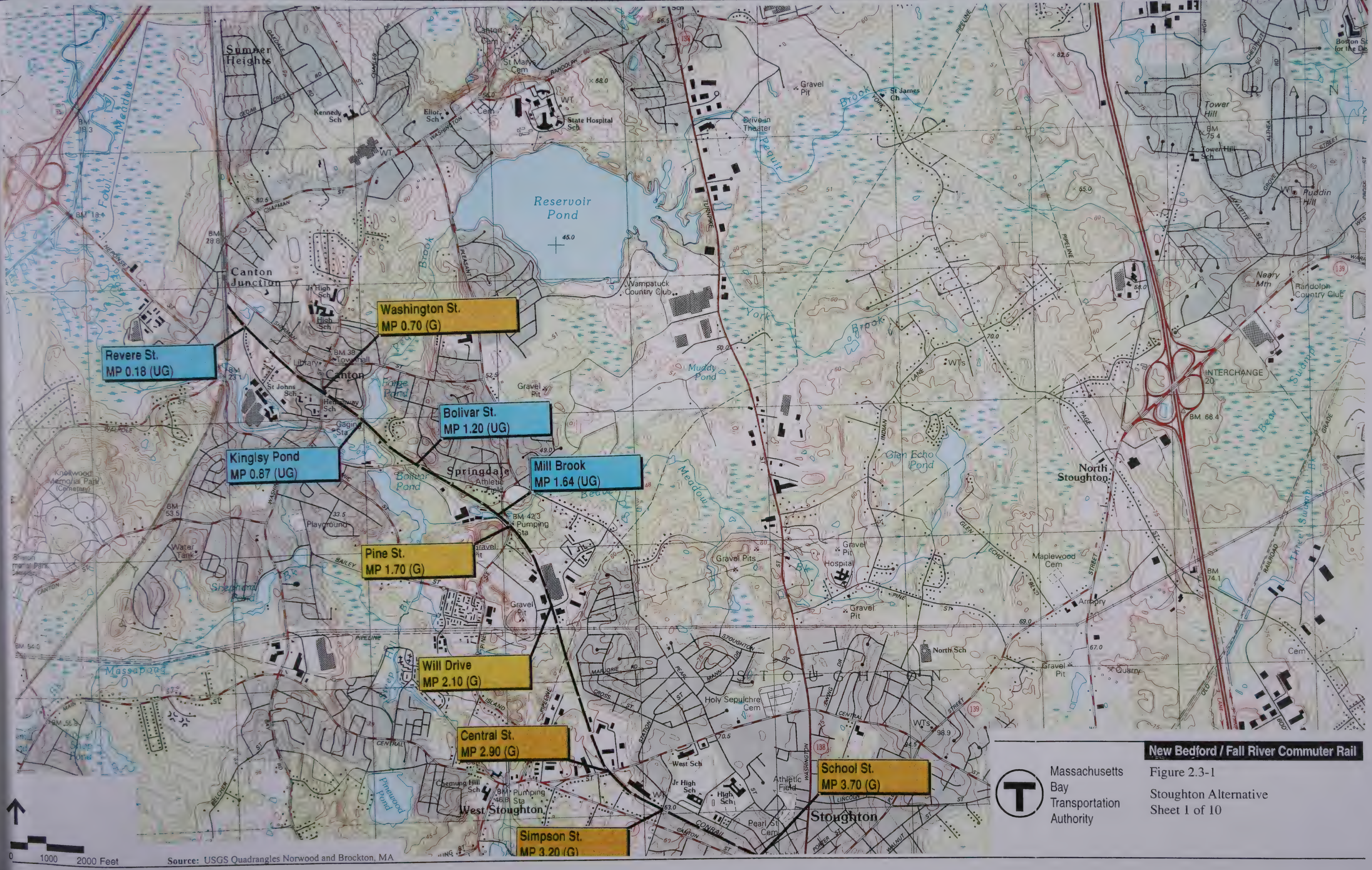
In response to comments received on the ENF and subsequently through the preliminary design process, several modifications have been made to project elements. This DEIR, in addition to responding to the Secretary's Certificates, provides an analysis of each of these new project elements.

2.4.1 Stoughton Alternative

The ENF identified the Attleboro Alternative as the MBTA's preferred alternative. The Secretary's Certificate on the ENF and several commentors, particularly the DEP, required that the MBTA re-examine the alternatives and reconsider both the Middleborough and Stoughton Alternatives. Based on this re-assessment, published in the 1997 Expanded Alternatives Analysis report, the MBTA has selected the Stoughton Alternative as the preferred alternative, as it would result in less loss of wetland than the Attleboro Alternative, would have higher ridership, provide greater transportation benefits, and would be more cost-effective.

This DEIR presents a detailed analysis of the Stoughton Alternative, and contrasts environmental impacts of the Stoughton and Attleboro Alternatives. A detailed description and analysis of the Attleboro Alternative was presented in the ENF: this DEIR presents supplemental information developed in response to the Secretary's Certificate.

The Stoughton Alternative would extend existing commuter rail service from South Station to Stoughton through Canton Junction and Canton along the inactive Stoughton Branch to Weir Junction in Taunton and continue along the active freight New Bedford Main Line and Fall River Secondary. The Stoughton Alternative is projected to serve 4,325 commuter rail patrons per day, (3,040 new transit riders) with 20 daily round-trips to Fall River and 20 round-trips to New Bedford. The estimated travel time from New Bedford to South Station is 1 hour and 20 minutes.



Source: USGS Quadrangles Norwood and Brockton, MA

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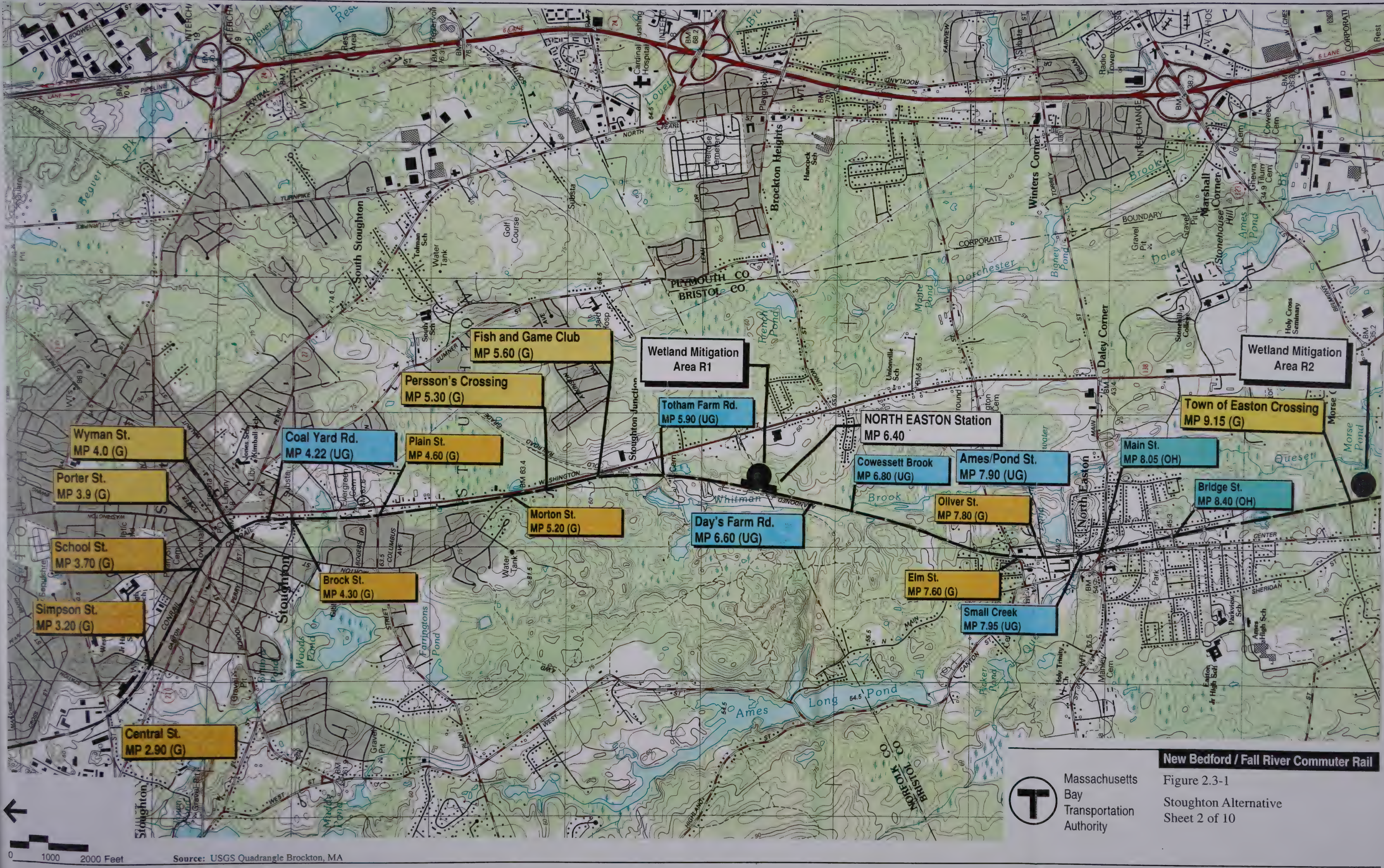
Figure 2.3-1

Stoughton Alternative
Sheet 1 of 10



Source: USGS Quadrangle Brockton, MA

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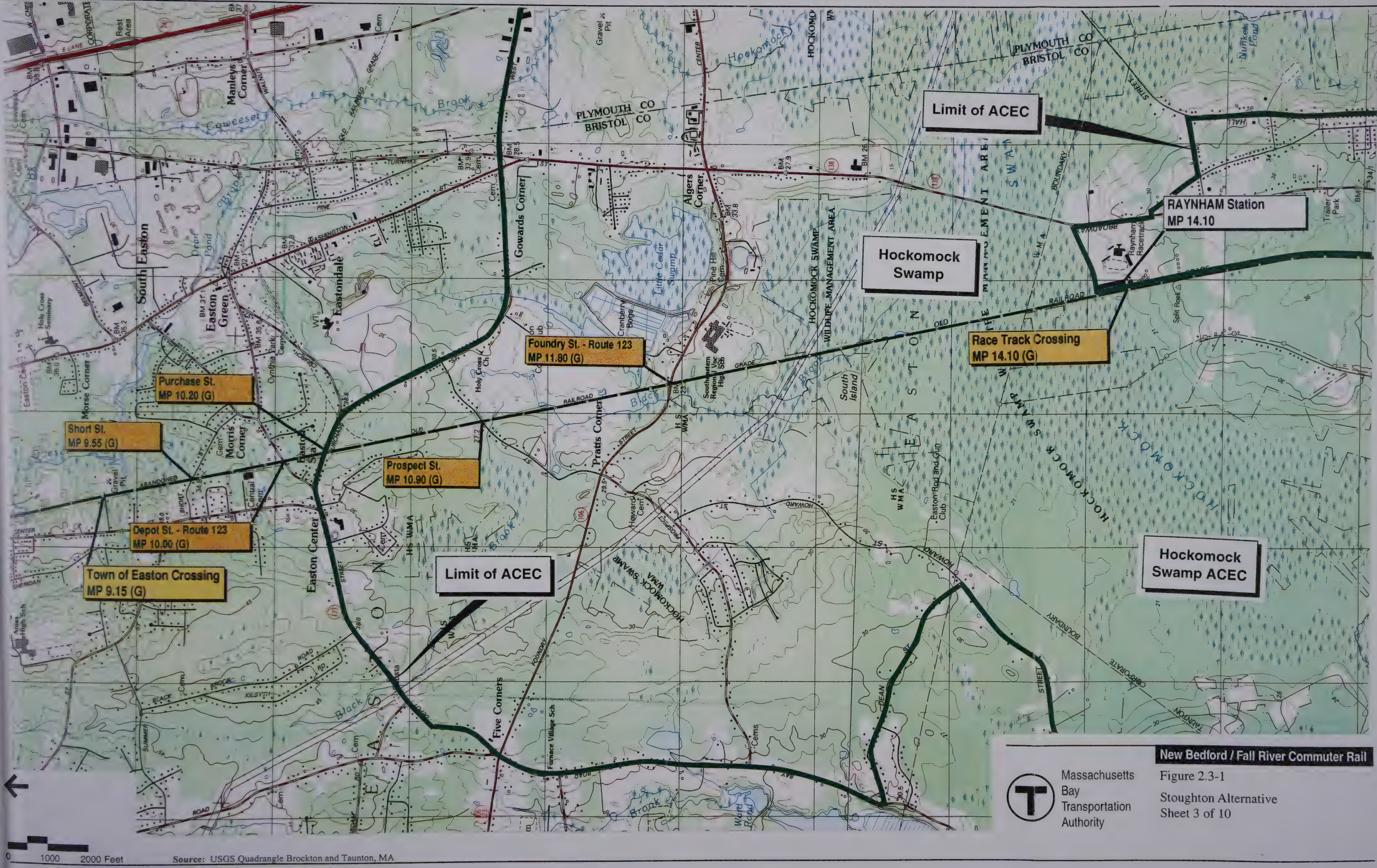
Massachusetts Bay Transportation Authority

Figure 2.3-1

Stoughton Alternative
Sheet 2 of 10



Source: USGS Quadrangle Brockton and Taunton, MA

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Figure 2.3-1

Stoughton Alternative
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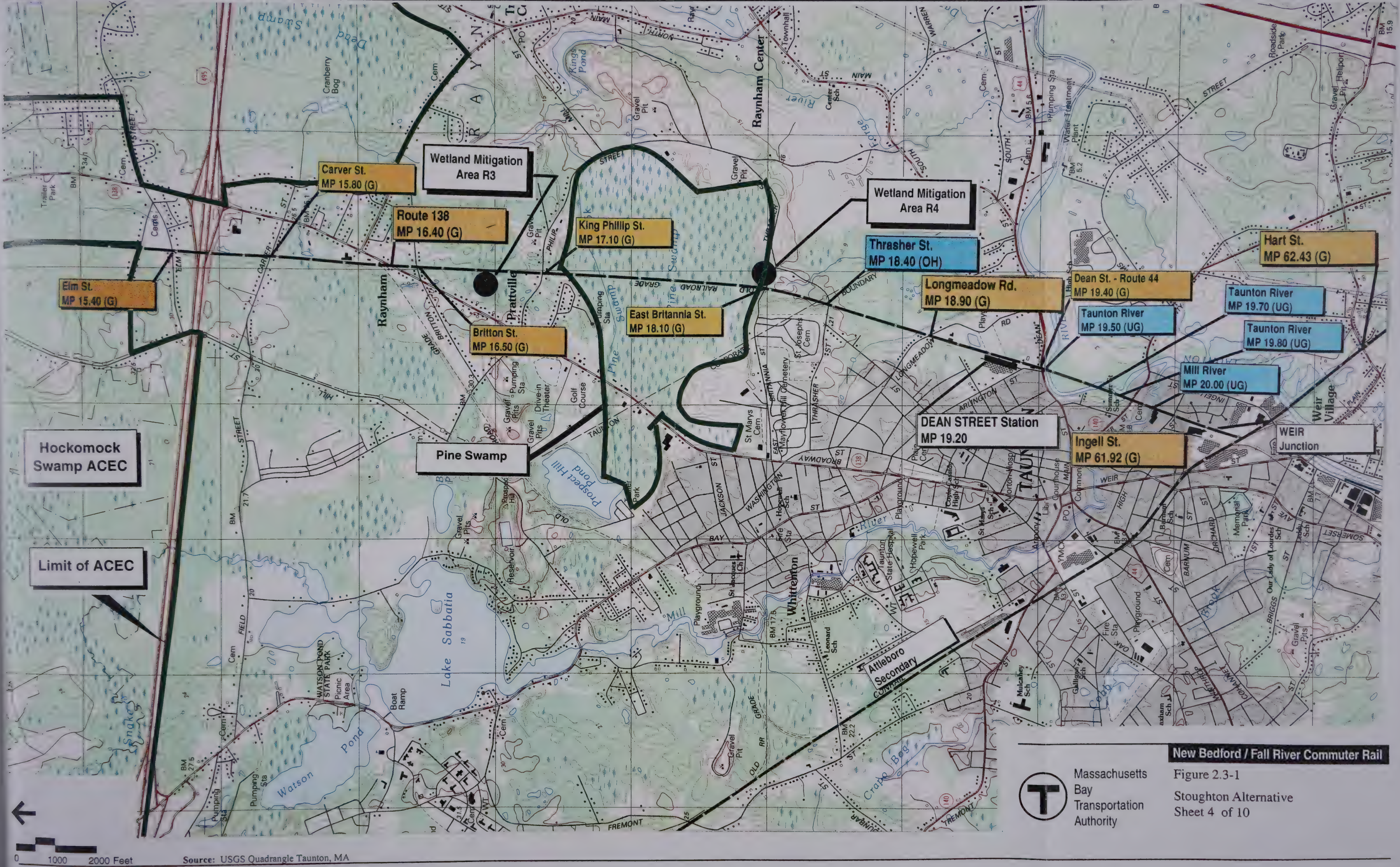

Source: USGS Quadrangle Taunton, MA

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Massachusetts Bay Transportation Authority

Figure 2.3-1

Stoughton Alternative
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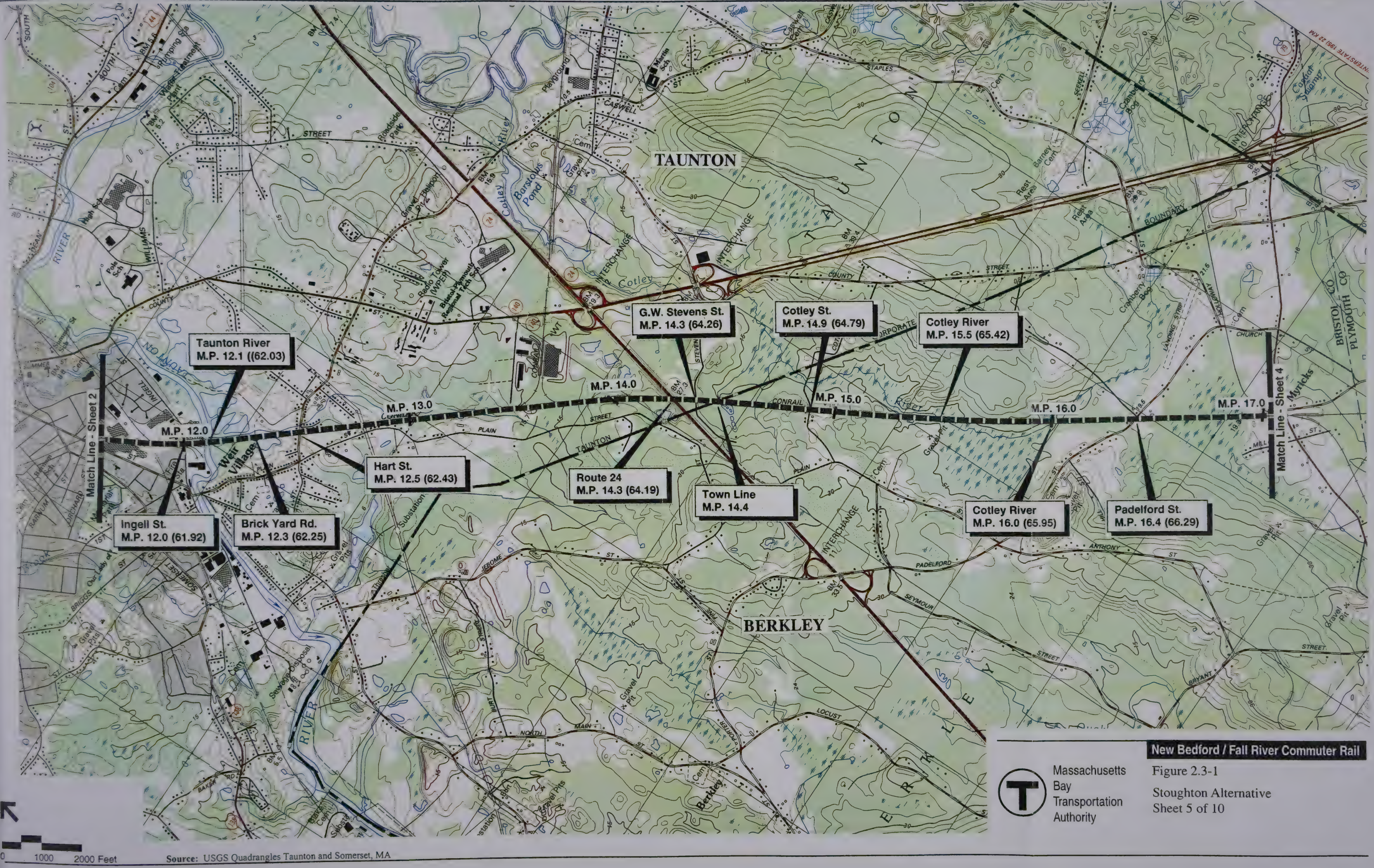

Source: USGS Quadrangles Taunton and Somerset, MA

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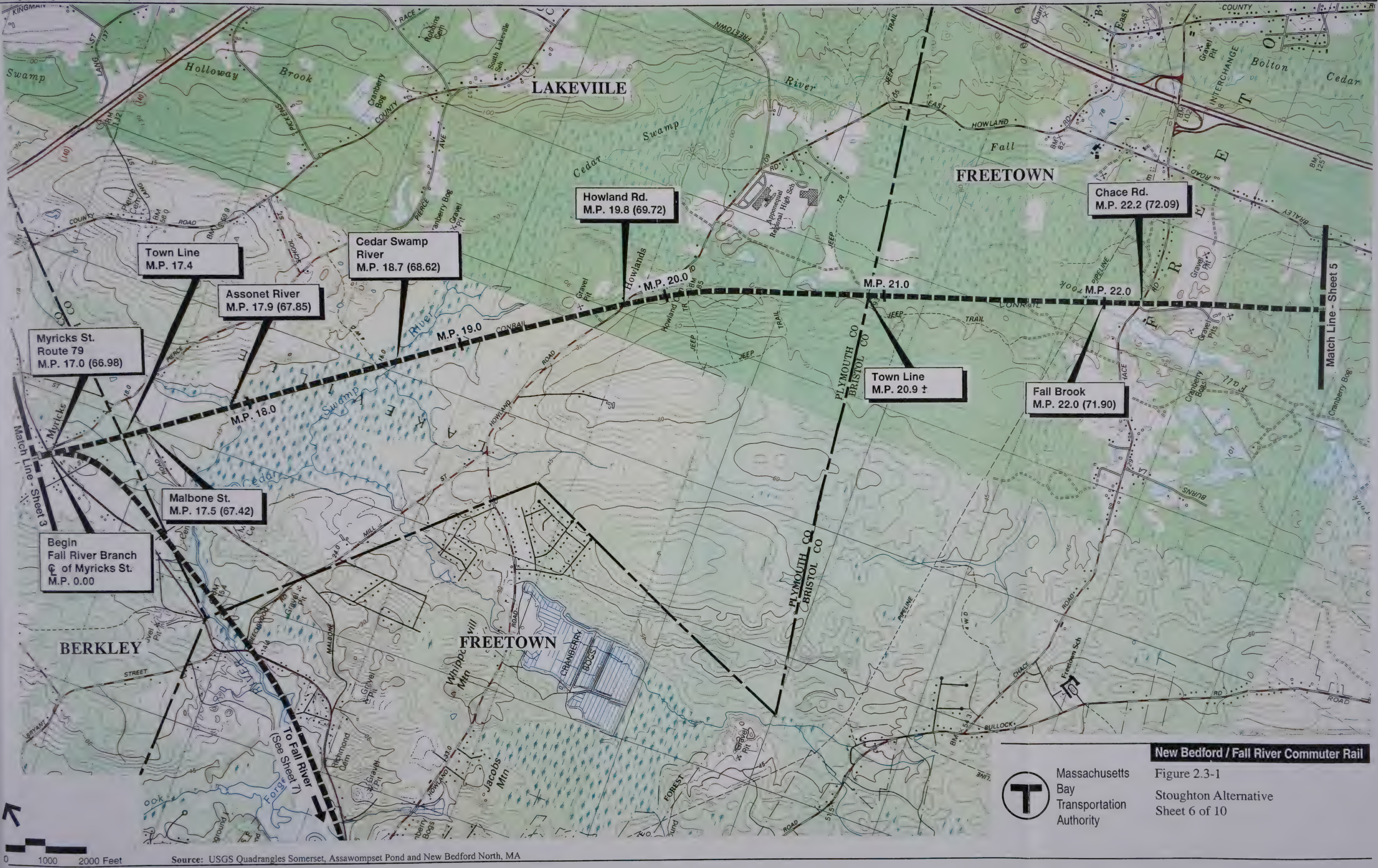
Figure 2.3-1

Stoughton Alternative
Sheet 5 of 10



Source: USGS Quadrangles Somerset, Assawompset Pond and New Bedford North, MA

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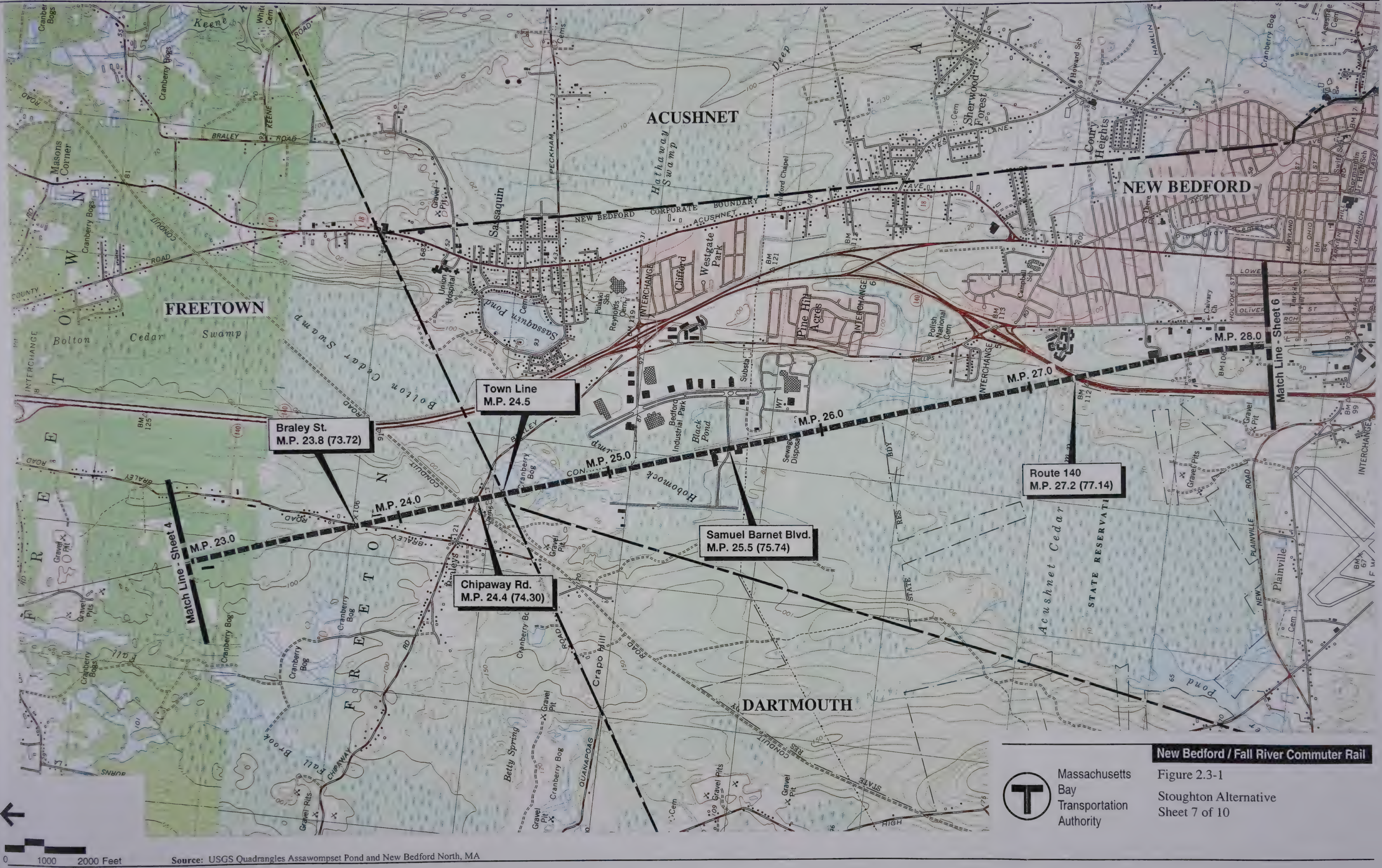
Figure 2.3-1

Stoughton Alternative
Sheet 6 of 10



Source: USGS Quadrangles Assawompset Pond and New Bedford North, MA

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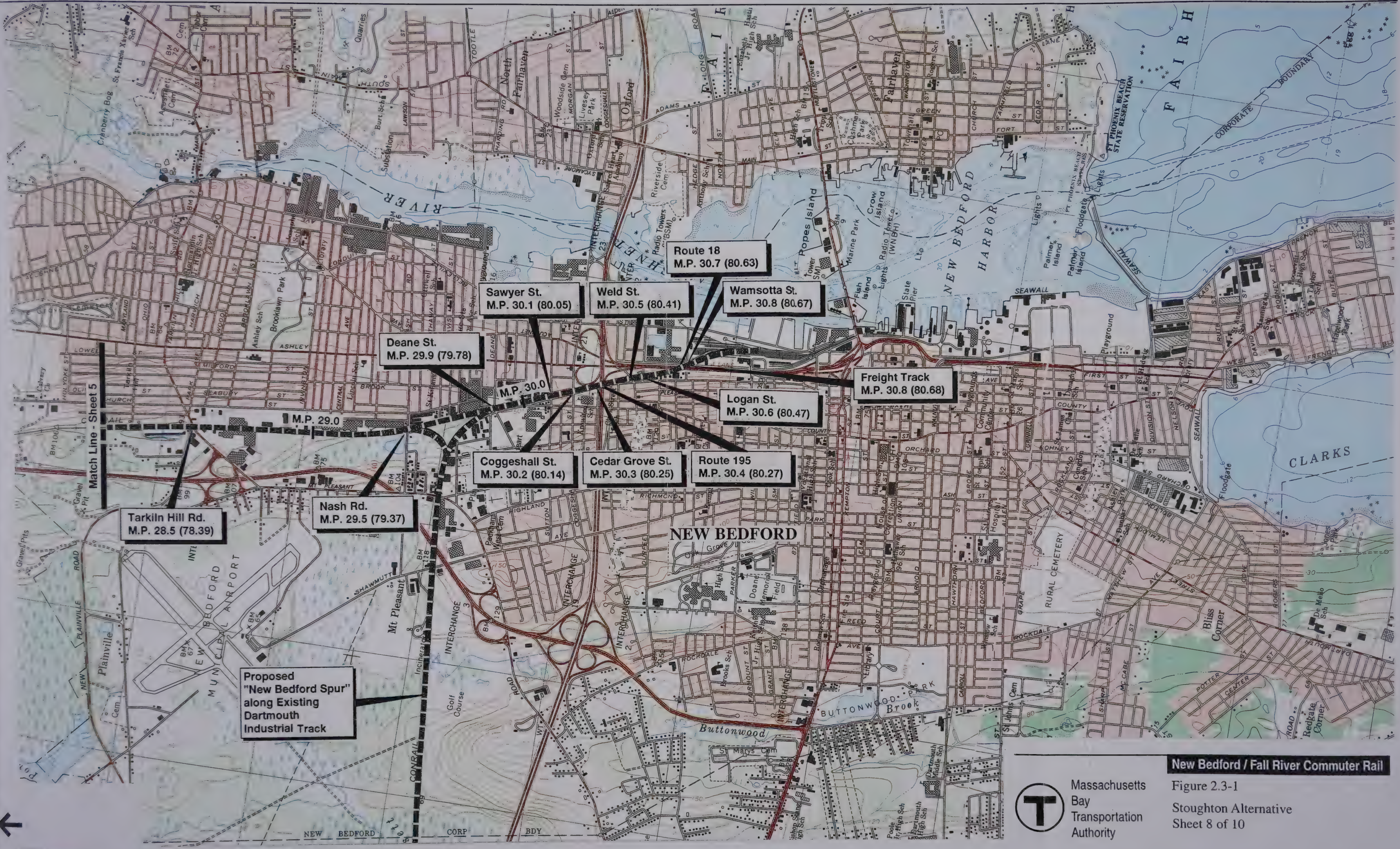
Authority

Figure 2.3-1

Stoughton Alternative
Sheet 7 of 10



Source: USGS Quadrangles New Bedford North and New Bedford South, MA

New Bedford / Fall River Commuter Rail

Massachusetts Bay Transportation Authority

Figure 2.3-1

Stoughton Alternative
Sheet 8 of 10

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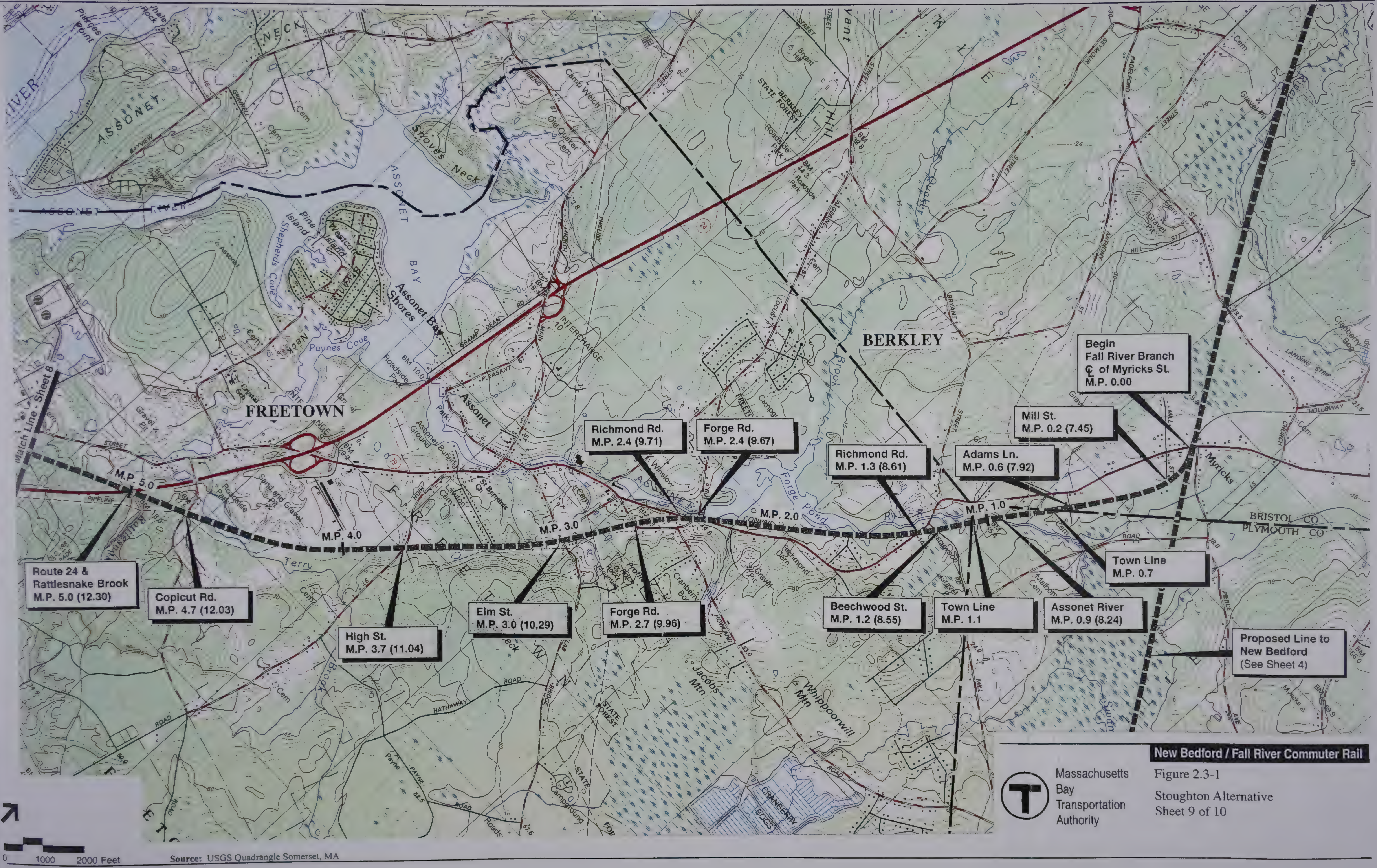

FREETOWN
BERKLEY
ASSONET
Assonet Bay
Assonet Bay Shores
ASSONET RIVER
BRISTOL CO
PLYMOUTH CO
Match Line - Sheet 8
M.P. 5.0
M.P. 4.0
M.P. 3.0
M.P. 2.0
M.P. 1.0
Route 24 & Rattlesnake Brook M.P. 5.0 (12.30)
Copicut Rd. M.P. 4.7 (12.03)
High St. M.P. 3.7 (11.04)
Elm St. M.P. 3.0 (10.29)
Forge Rd. M.P. 2.7 (9.96)
Richmond Rd. M.P. 2.4 (9.71)
Forge Rd. M.P. 2.4 (9.67)
Richmond Rd. M.P. 1.3 (8.61)
Beechwood St. M.P. 1.2 (8.55)
Town Line M.P. 1.1
Adams Ln. M.P. 0.6 (7.92)
Assonet River M.P. 0.9 (8.24)
Town Line M.P. 0.7
Mill St. M.P. 0.2 (7.45)
Begin Fall River Branch ℄ of Myricks St. M.P. 0.00
Proposed Line to New Bedford (See Sheet 4)
0
1000
2000 Feet

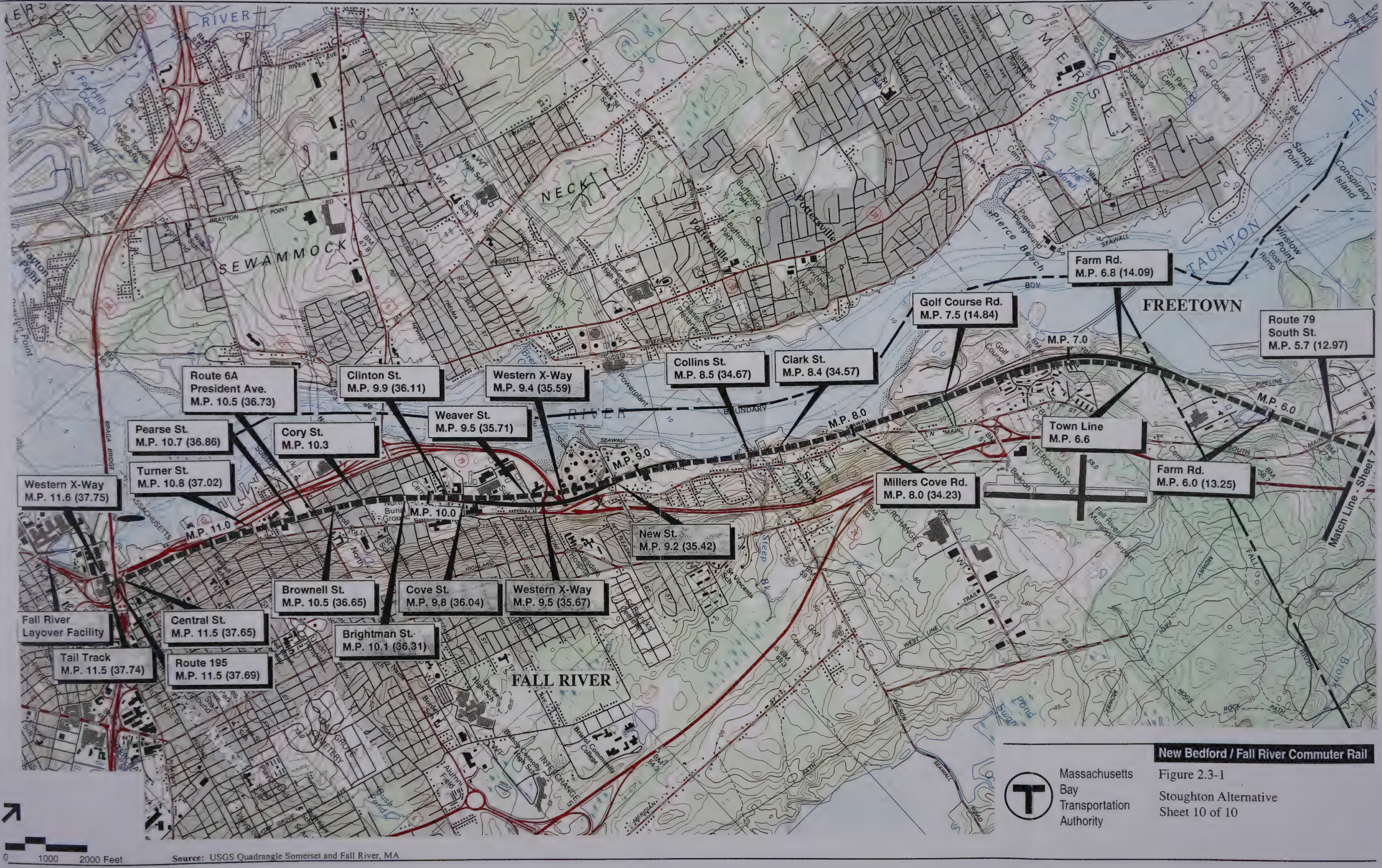
Source: USGS Quadrangle Somerset, MA

Massachusetts Bay Transportation Authority

New Bedford / Fall River Commuter Rail

Figure 2.3-1

Stoughton Alternative
Sheet 9 of 10



Source: USGS Quadrangle Somerset and Fall River, MA

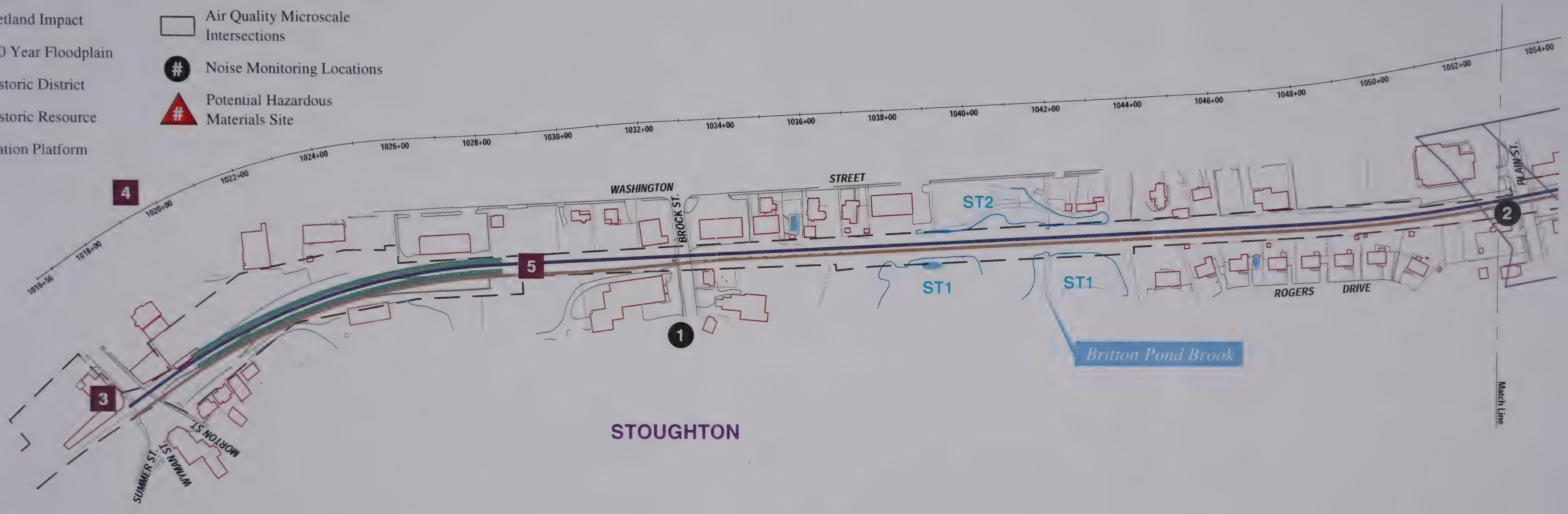
Massachusetts
Bay
Transportation
Authority

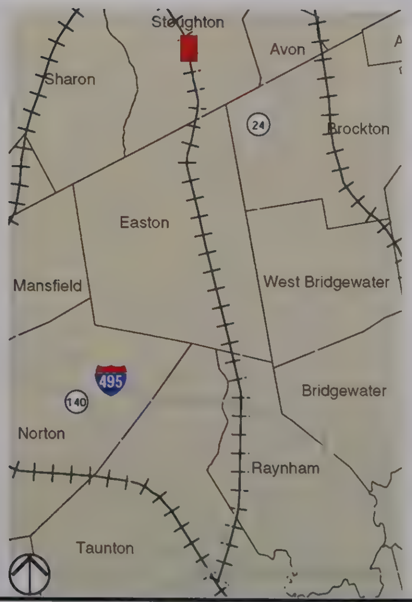
New Bedford / Fall River Commuter Rail

Figure 2.3-1

Stoughton Alternative
Sheet 10 of 10

- ▬ Proposed Track 1
- ▬ Proposed Track 2
- - - - Right of Way
- — Water
- — Wetland Boundaries
- 🟦 Wetland Impact
- — 100 Year Floodplain
- ☐ Historic District
- # Historic Resource
- ▬ Station Platform
- 🟩 Rare Species Habitat and Significant Natural Communities
- ▨ Estimated Habitat of Rare Wildlife
- ▨ DEP Approved Zone II Well Head Protection Area
- ☐ Air Quality Microscale Intersections
- ● # Noise Monitoring Locations
- ▲ # Potential Hazardous Materials Site





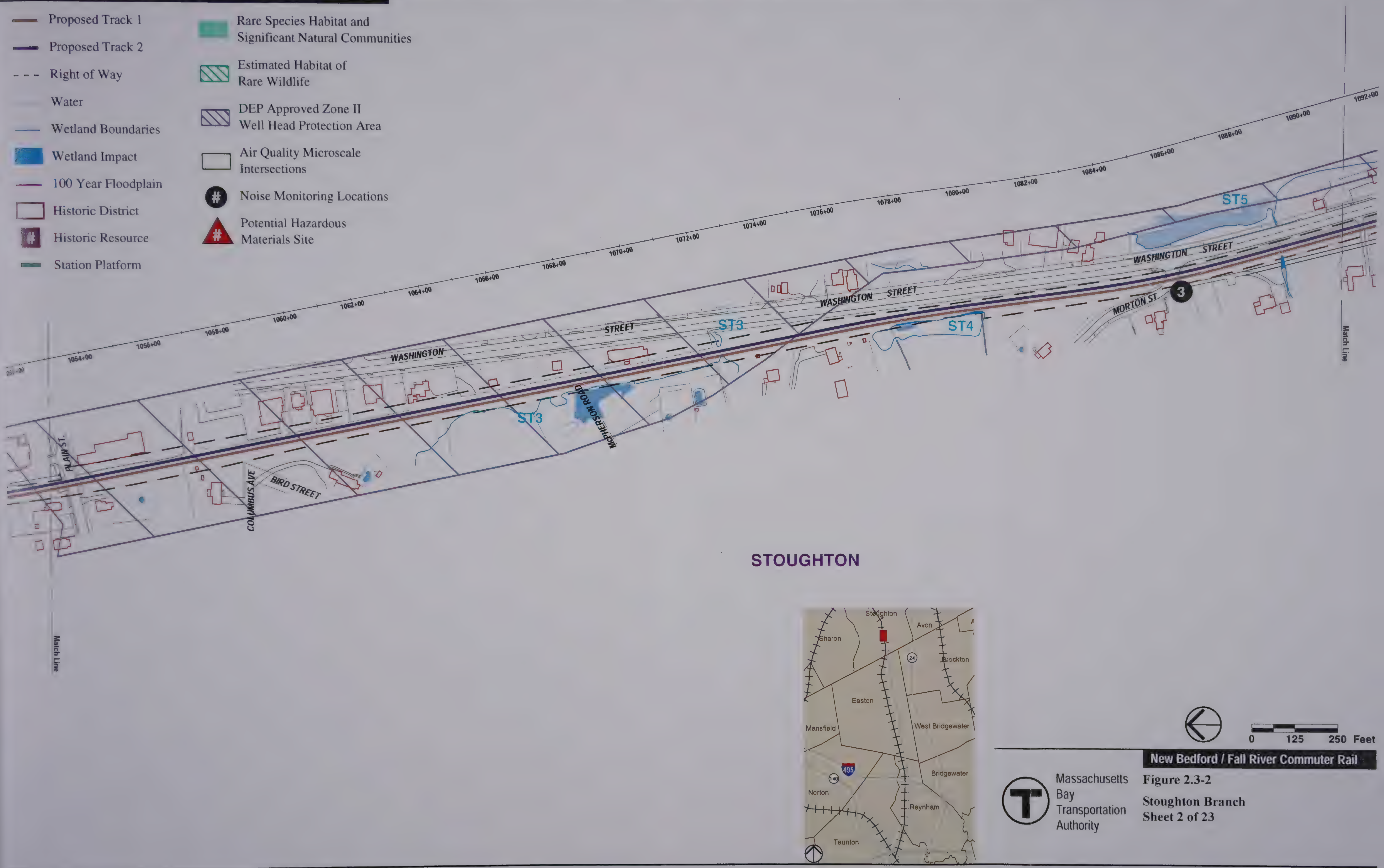
0 125 250 Feet

New Bedford / Fall River Commuter Rail

Massachusetts Bay Transportation Authority

Figure 2.3-2

Stoughton Branch
Sheet 1 of 23

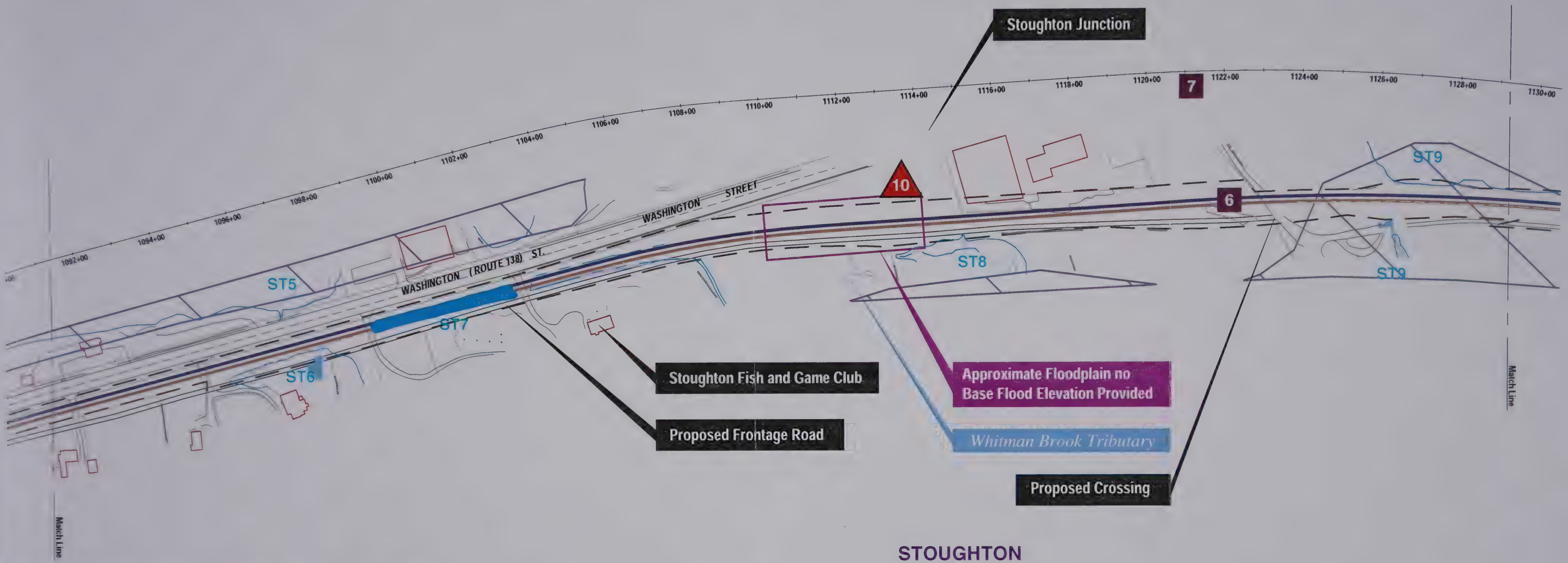


New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

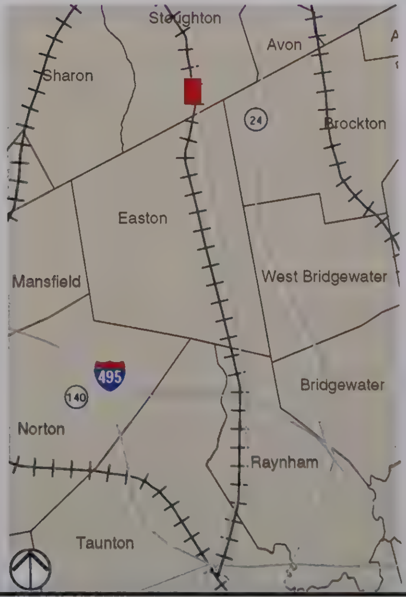
Figure 2.3-2

Stoughton Branch
Sheet 2 of 23



STOUGHTON

- ▬ Proposed Track 1
- ▬ Proposed Track 2
- - - - Right of Way
- — Water
- — Wetland Boundaries
- ▬ Wetland Impact
- — 100 Year Floodplain
- ☐ Historic District
- # Historic Resource
- ▬ Station Platform
- ▬ Rare Species Habitat and Significant Natural Communities
- ▨ Estimated Habitat of Rare Wildlife
- ▨ DEP Approved Zone II Well Head Protection Area
- ☐ Air Quality Microscale Intersections
- # Noise Monitoring Locations
- # Potential Hazardous Materials Site



0 125 250 Feet

New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 3 of 23

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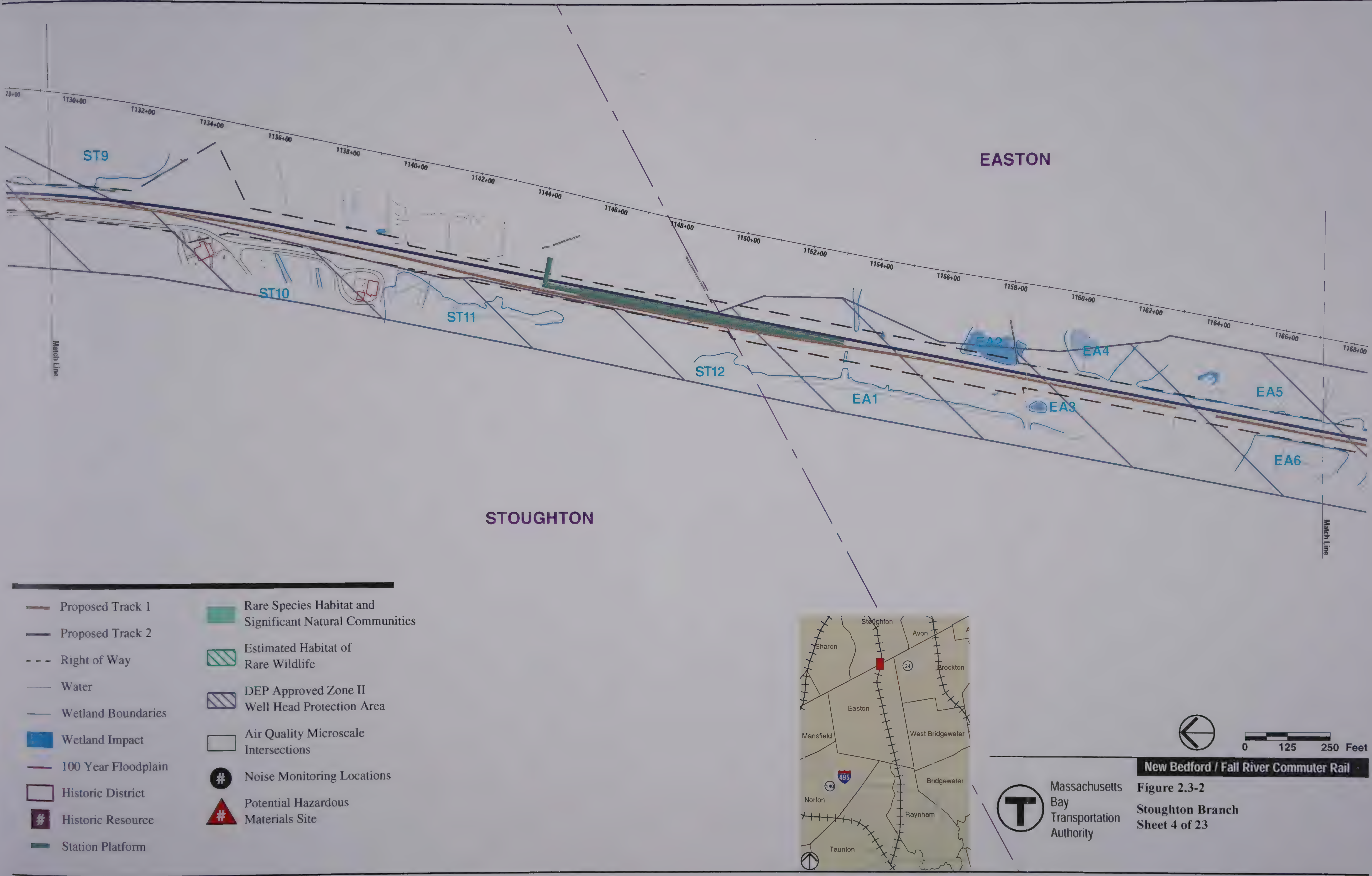
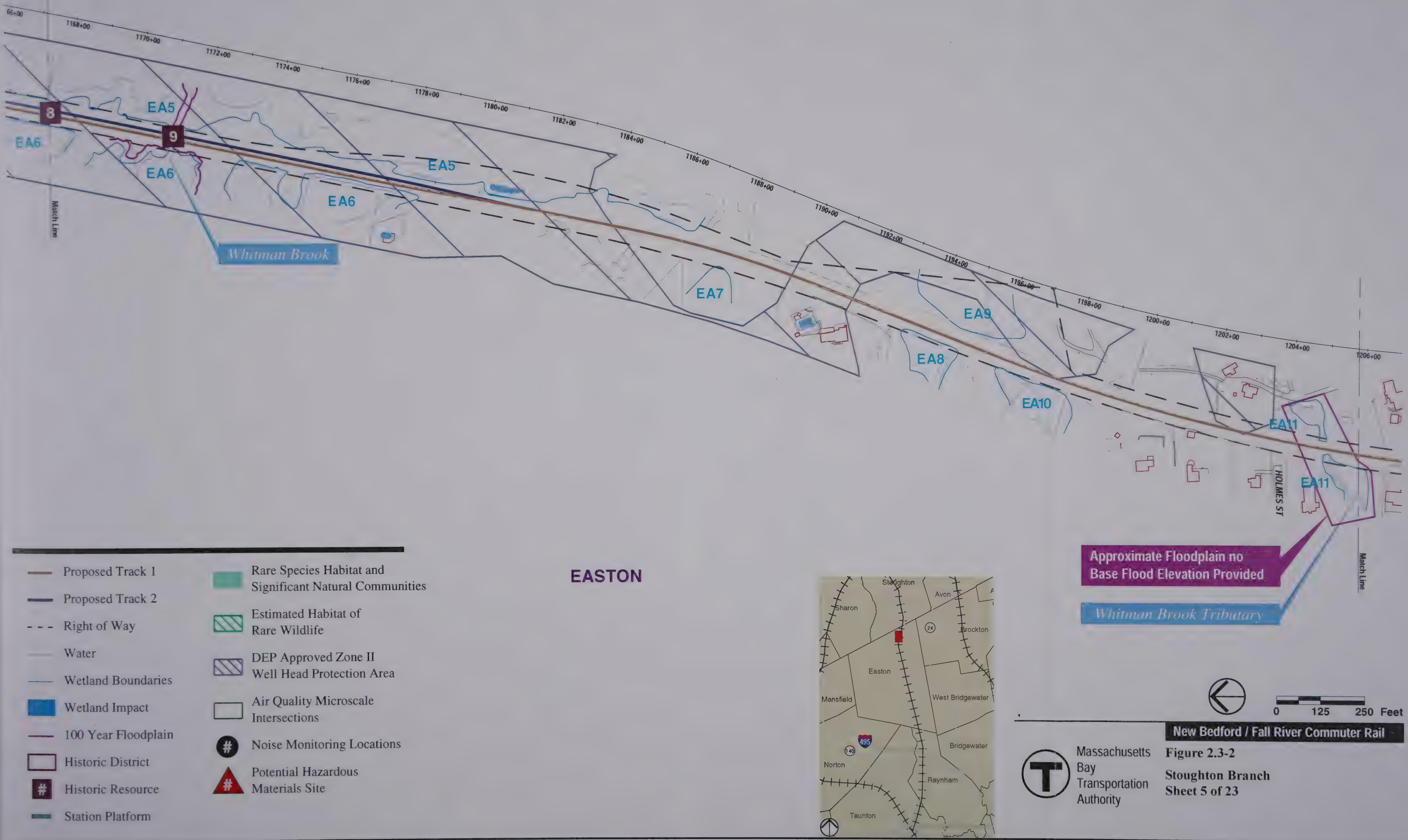


New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 4 of 23



New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 5 of 23

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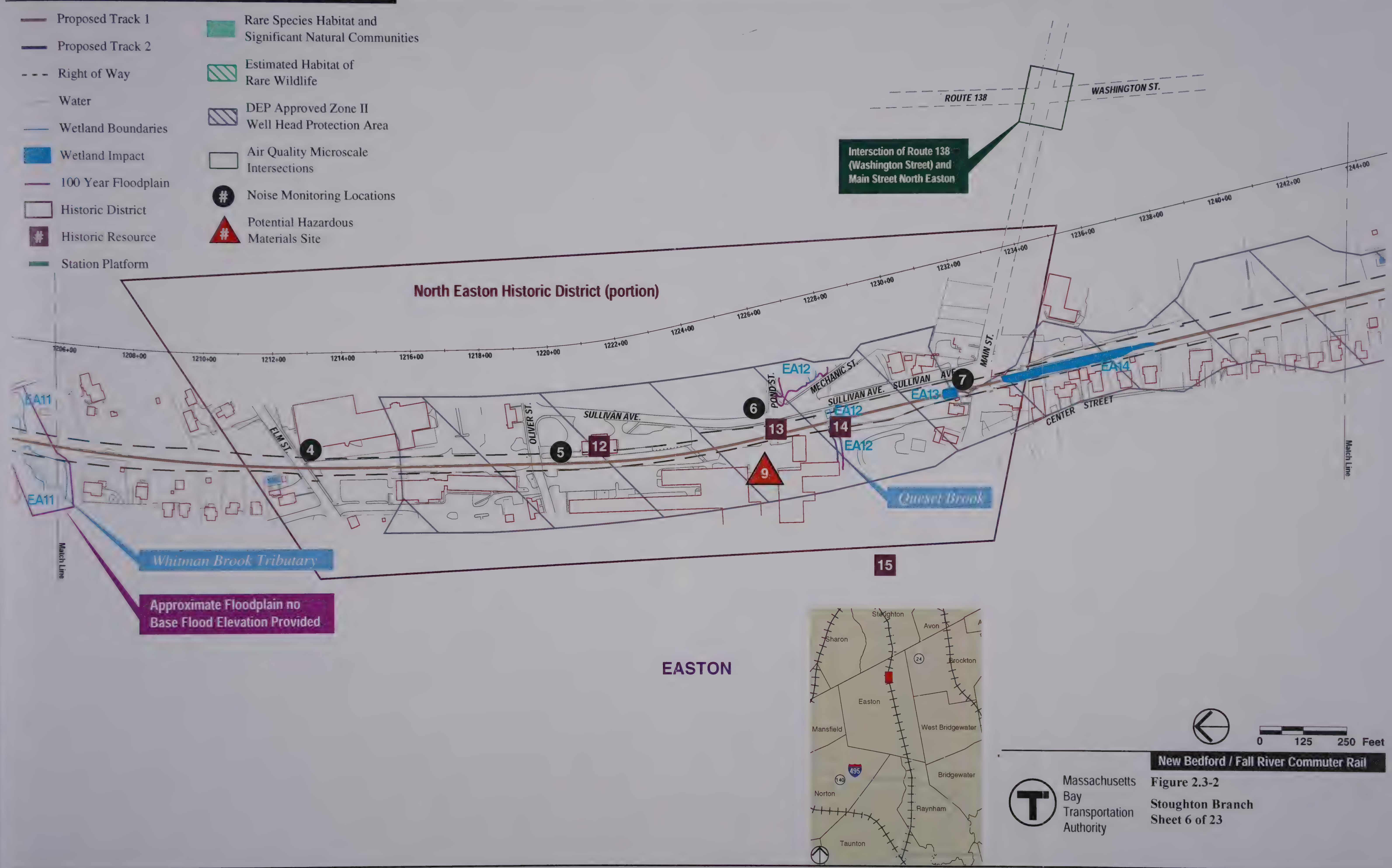
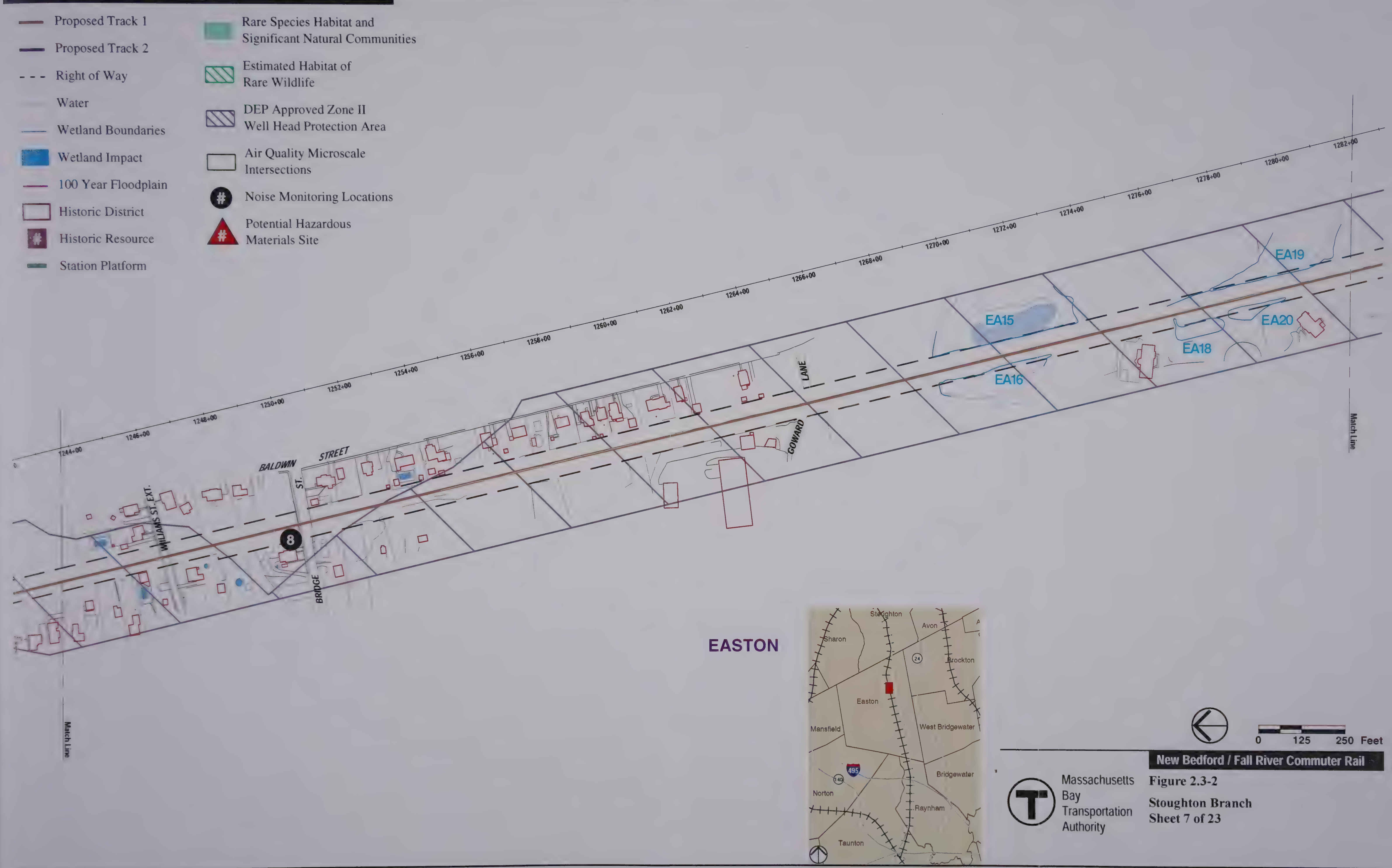


New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 6 of 23

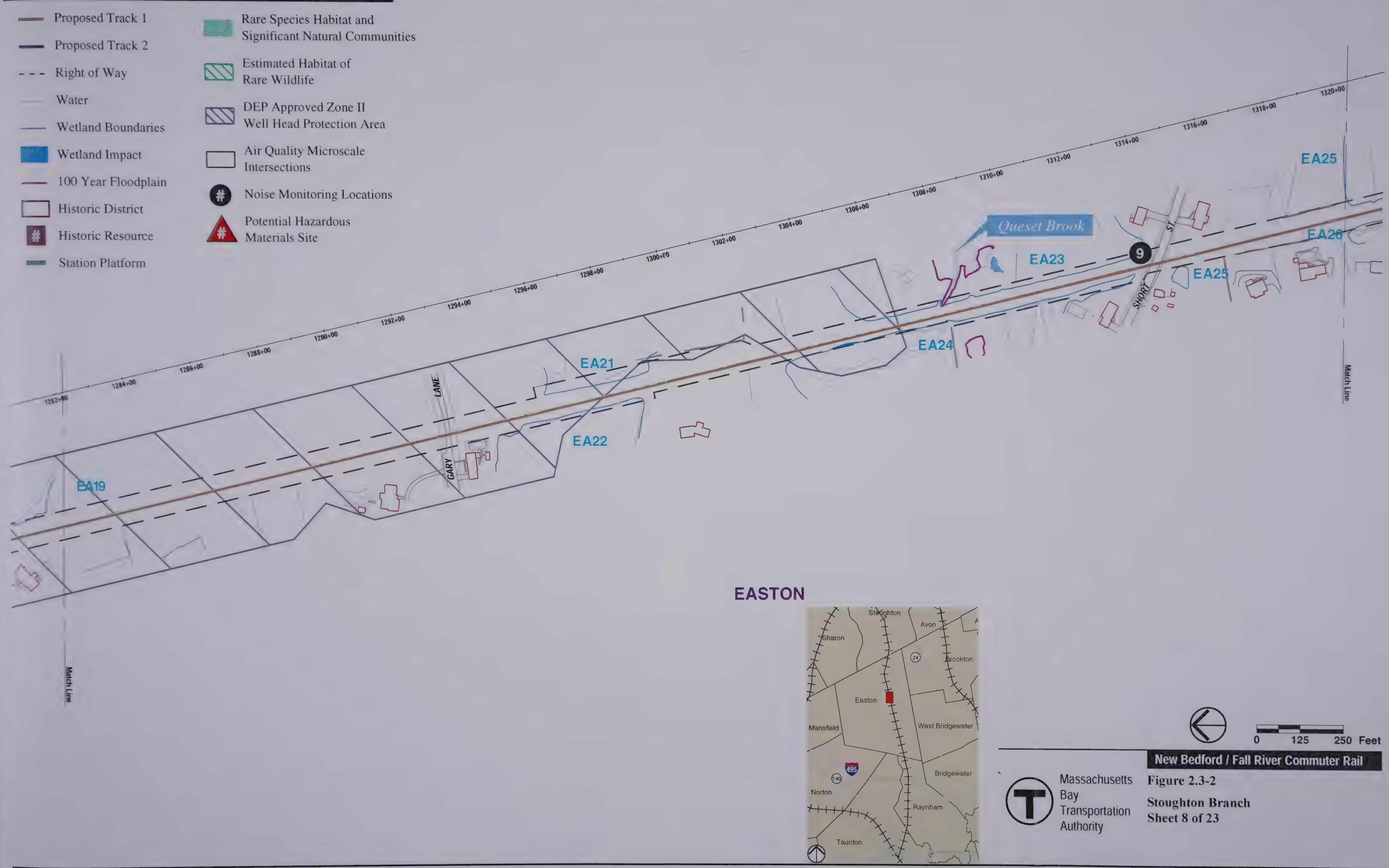


Massachusetts Bay Transportation Authority

New Bedford / Fall River Commuter Rail

Figure 2.3-2

Stoughton Branch
Sheet 7 of 23



New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 8 of 23

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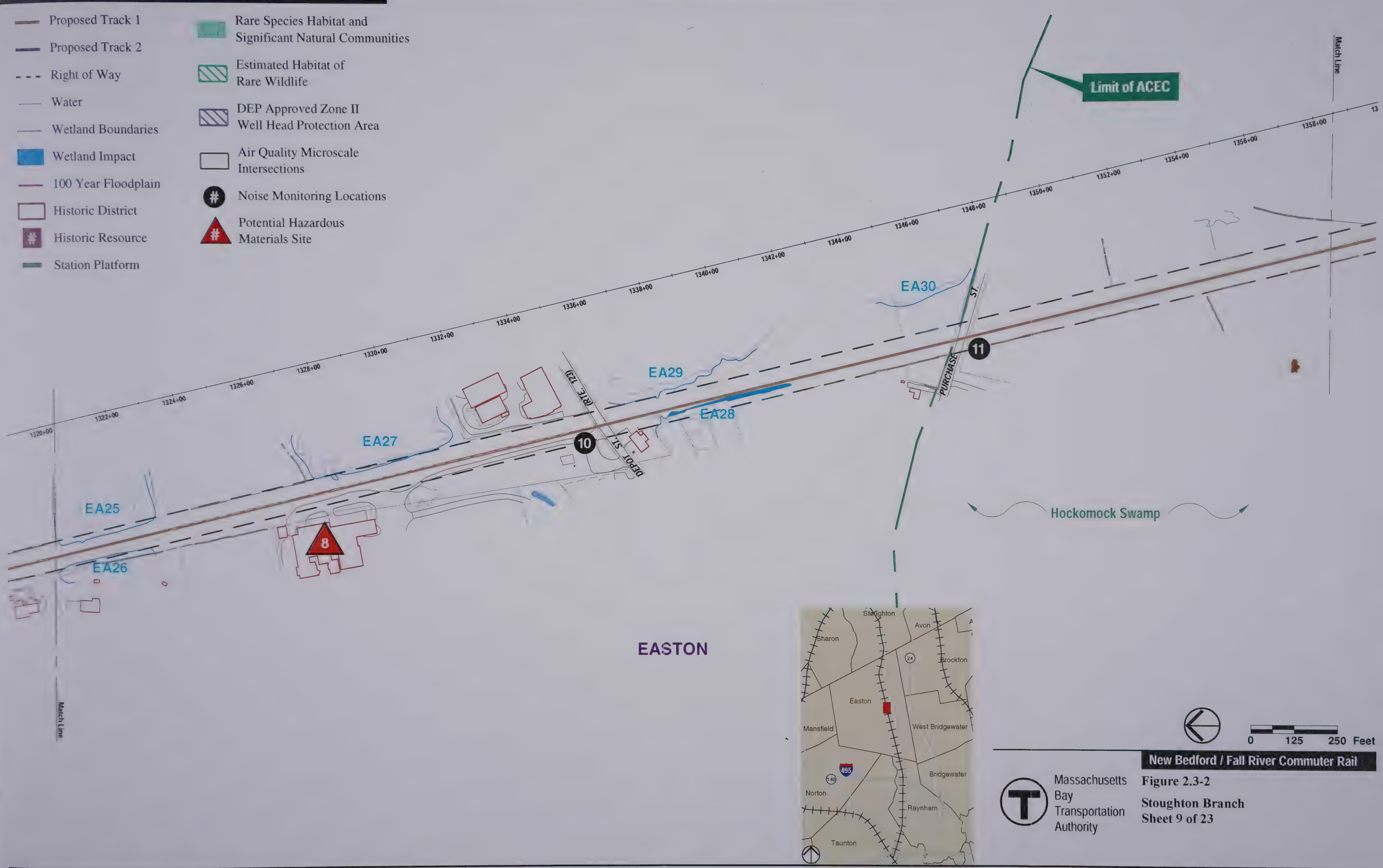
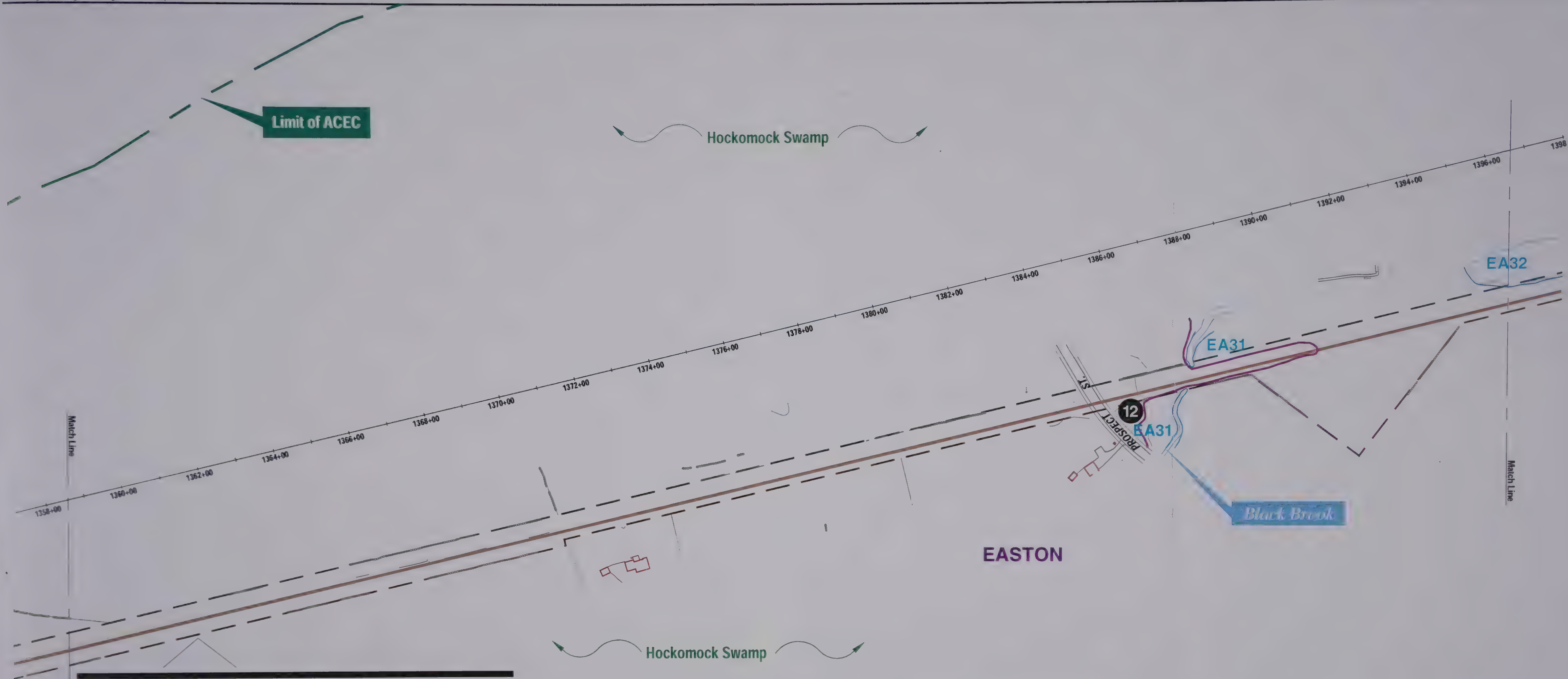


New Bedford / Fall River Commuter Rail

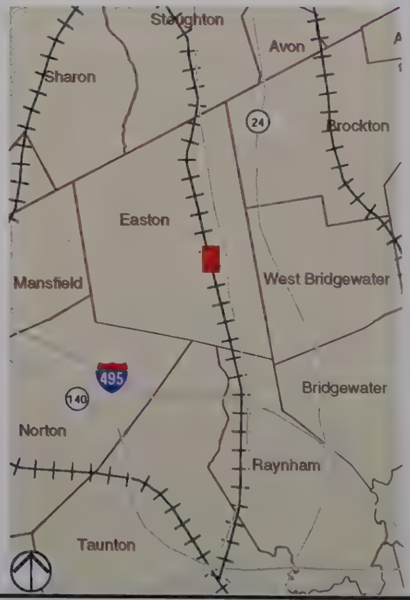
Massachusetts Bay Transportation Authority

Figure 2.3-2

Stoughton Branch
Sheet 9 of 23



▬	Proposed Track 1	🟩	Rare Species Habitat and Significant Natural Communities
▬	Proposed Track 2	▨	Estimated Habitat of Rare Wildlife
- - -	Right of Way	▨	DEP Approved Zone II Well Head Protection Area
—	Water	☐	Air Quality Microscale Intersections
—	Wetland Boundaries	#	Noise Monitoring Locations
🟦	Wetland Impact	#	Potential Hazardous Materials Site
—	100 Year Floodplain		
☐	Historic District		
#	Historic Resource		
▬	Station Platform		



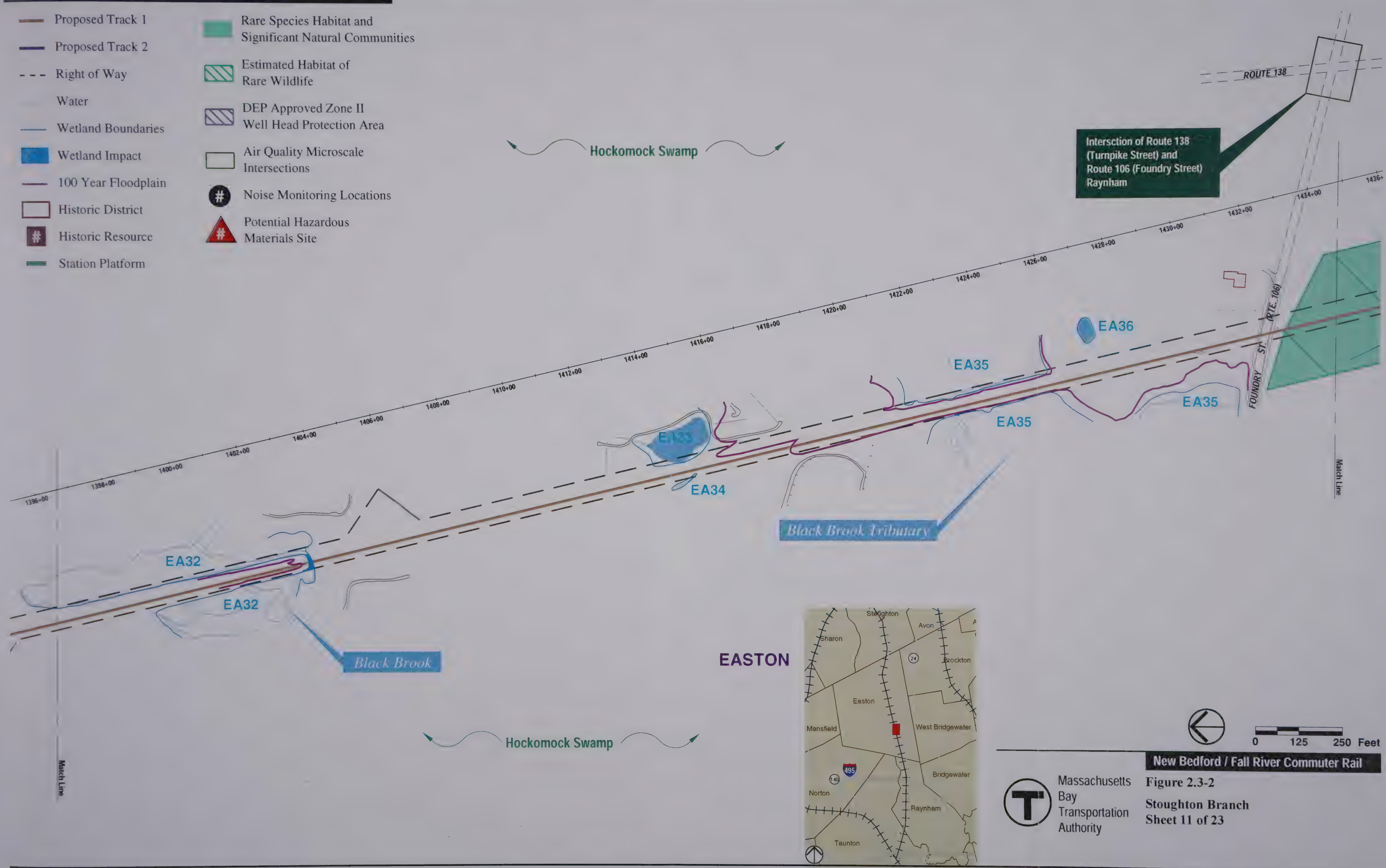
0 125 250 Feet

New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 10 of 23

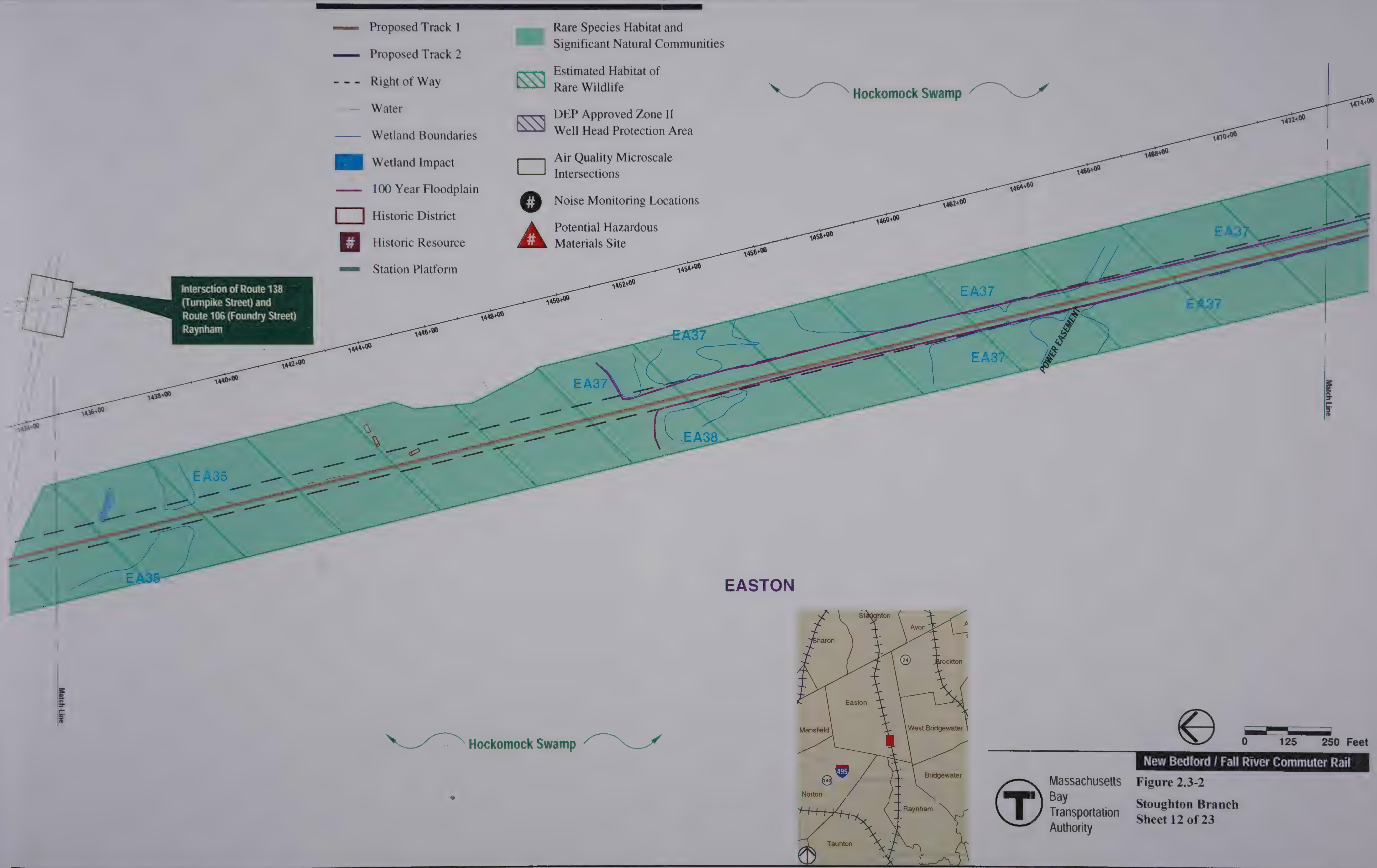


New Bedford / Fall River Commuter Rail

Massachusetts Bay Transportation Authority

Figure 2.3-2

Stoughton Branch
Sheet 11 of 23



New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 12 of 23

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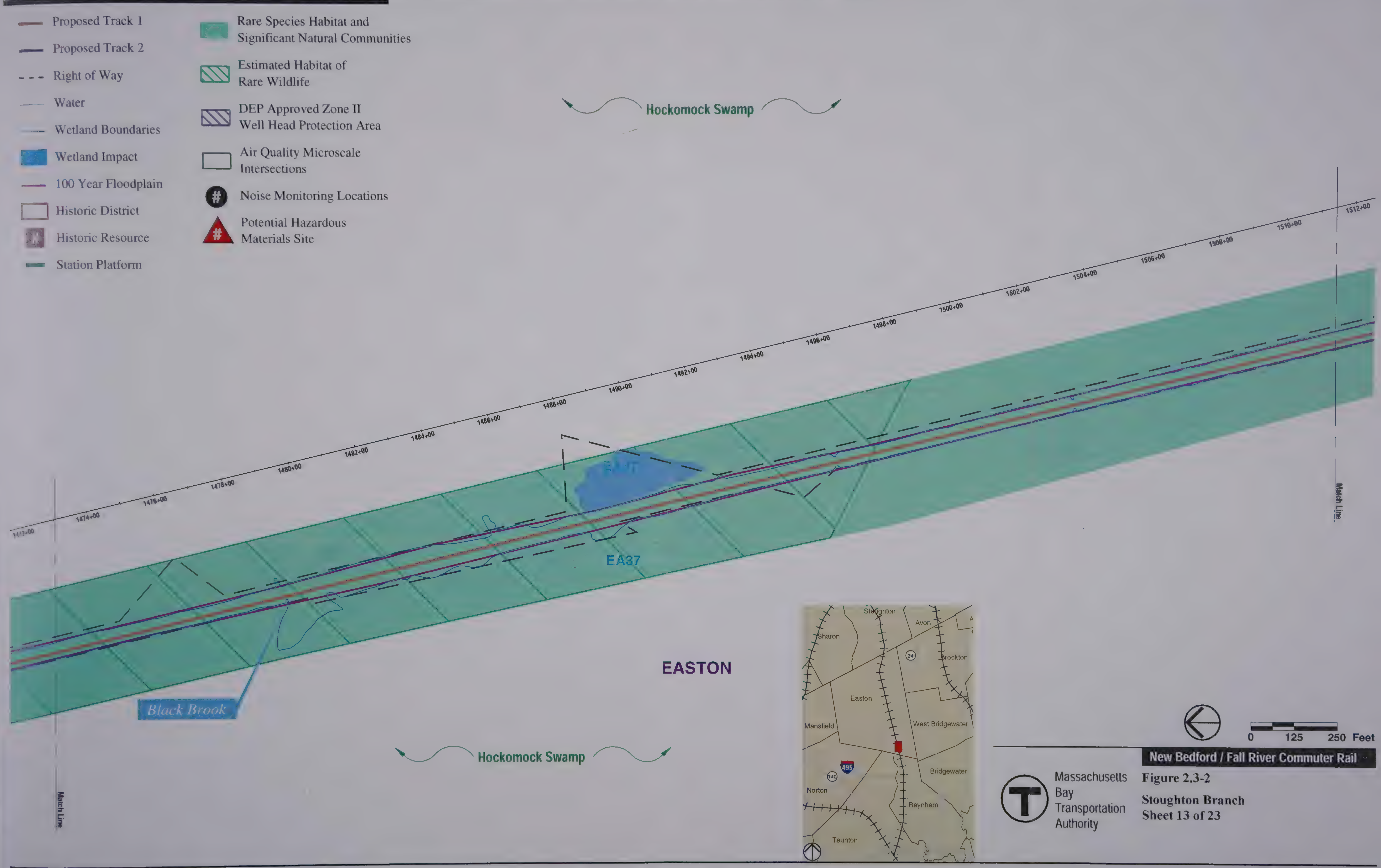

New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 13 of 23

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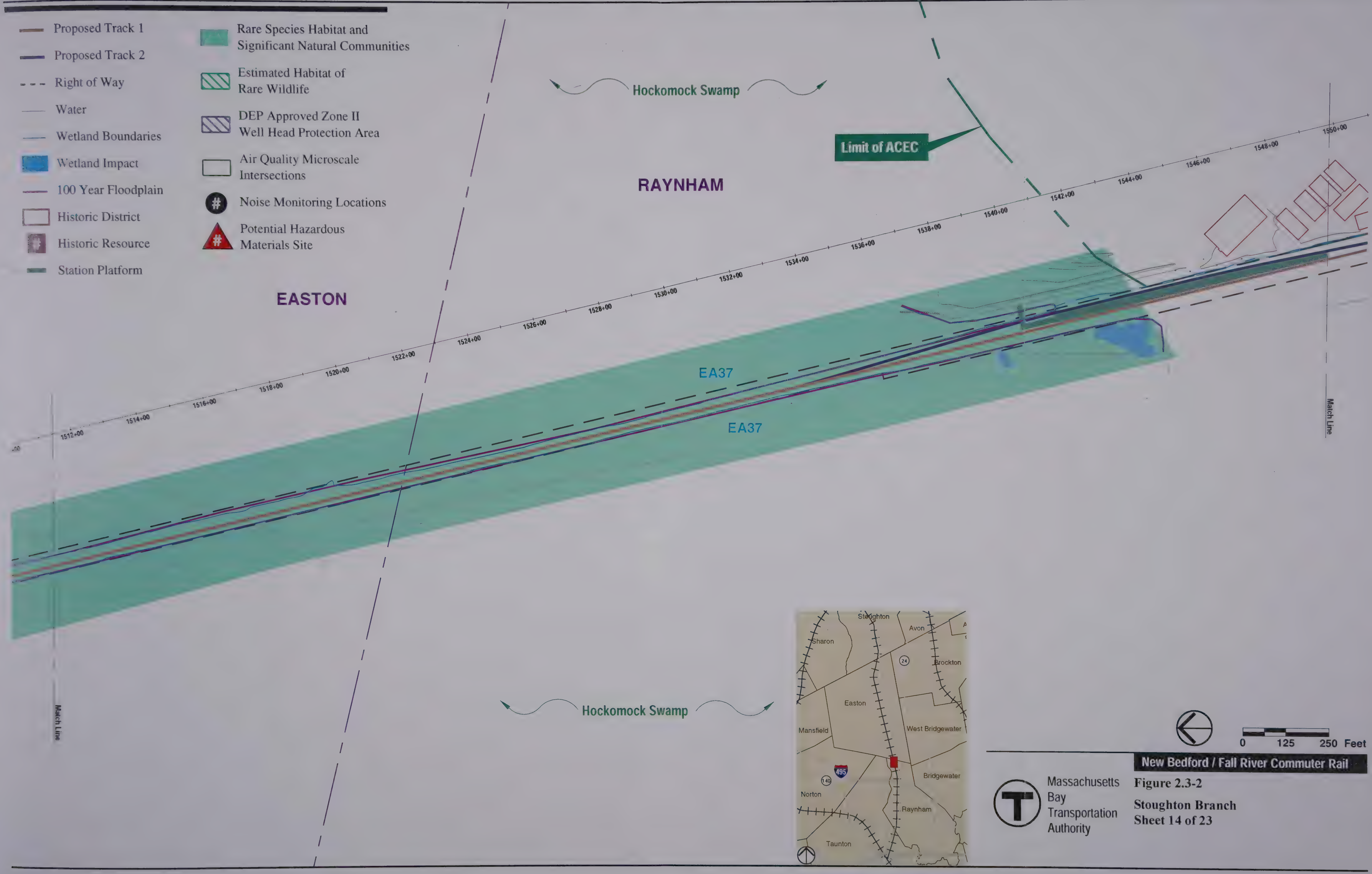
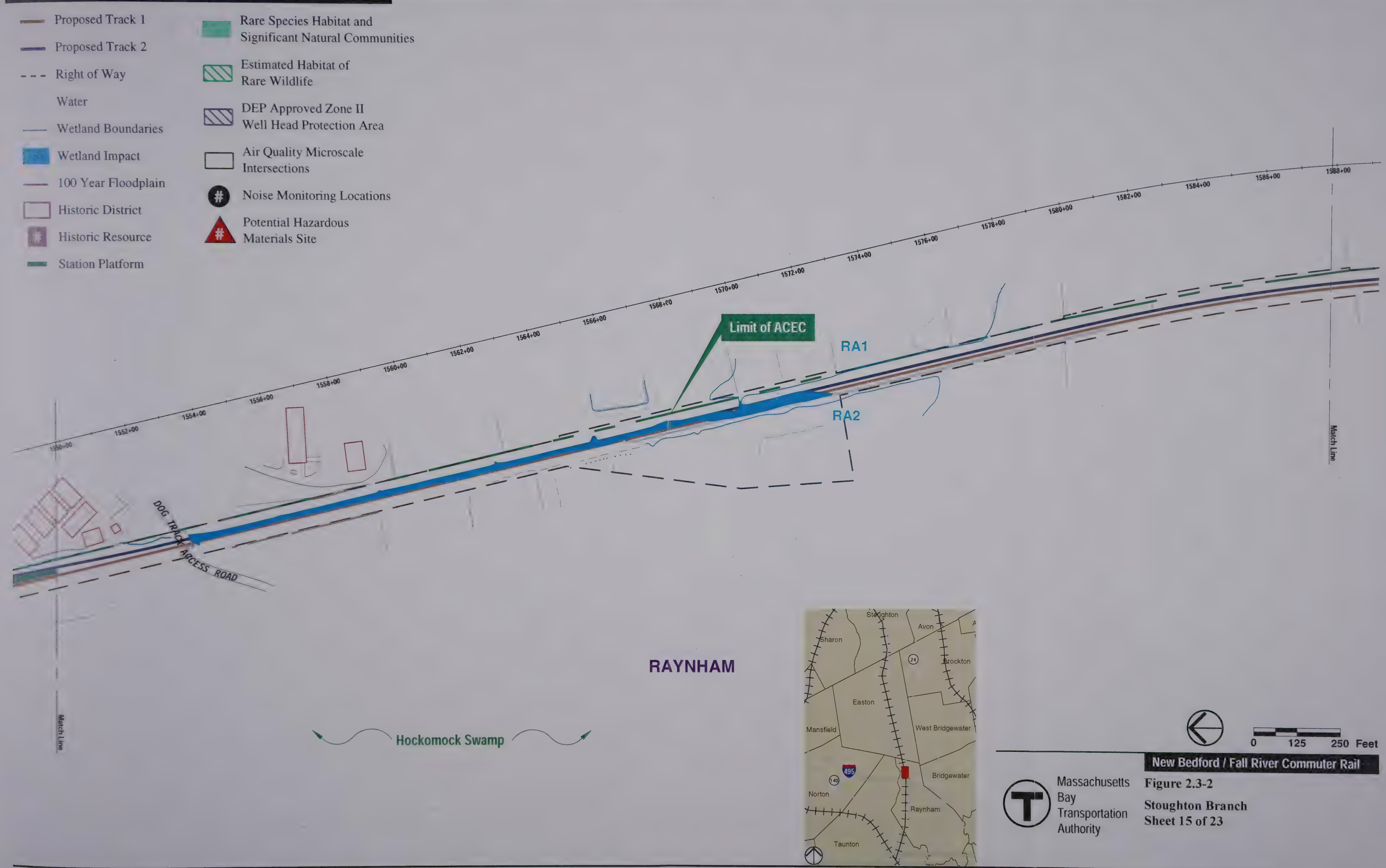


New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 14 of 23



New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 15 of 23

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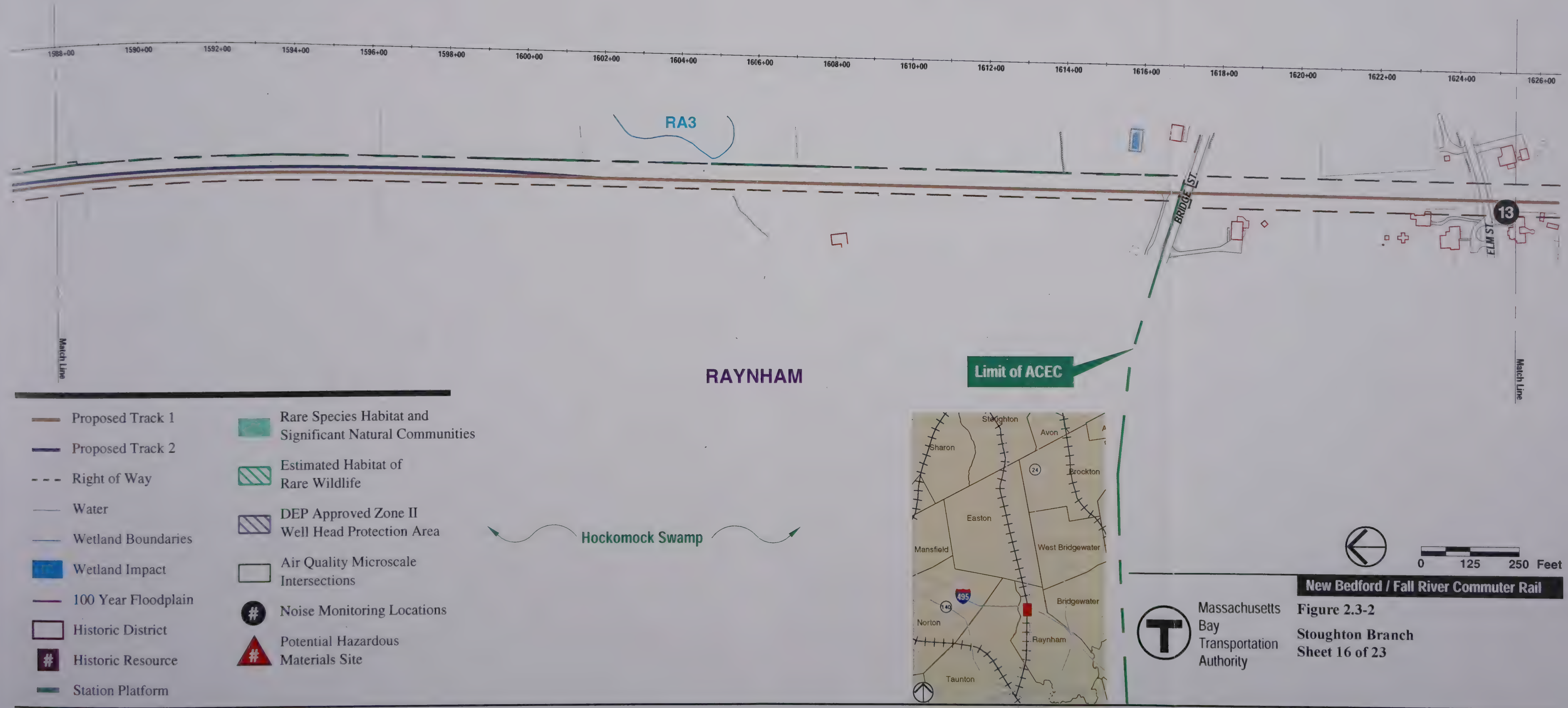
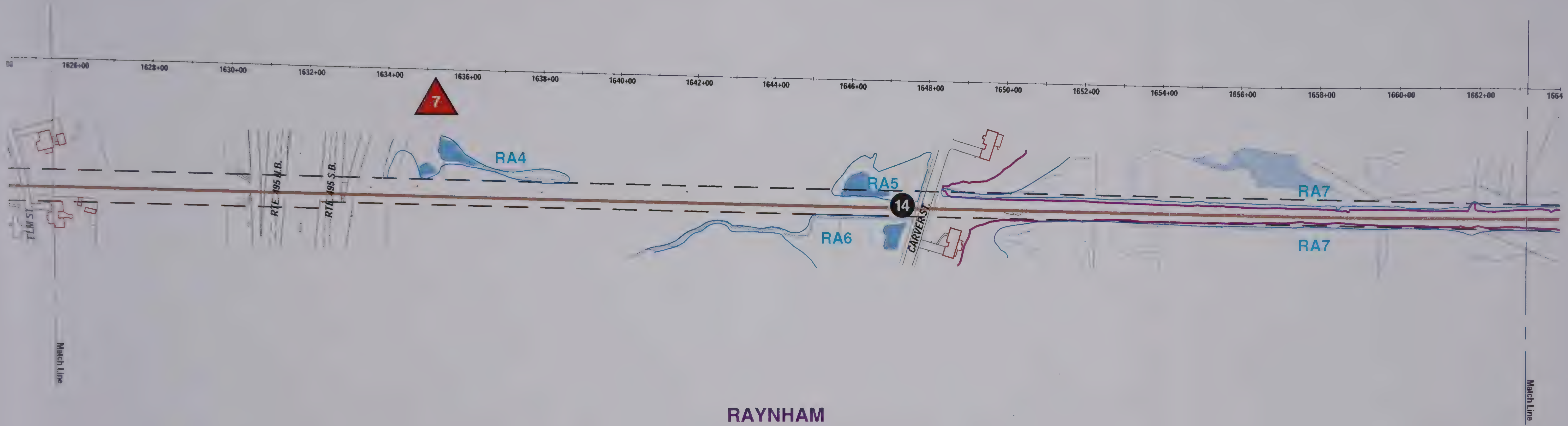


New Bedford / Fall River Commuter Rail

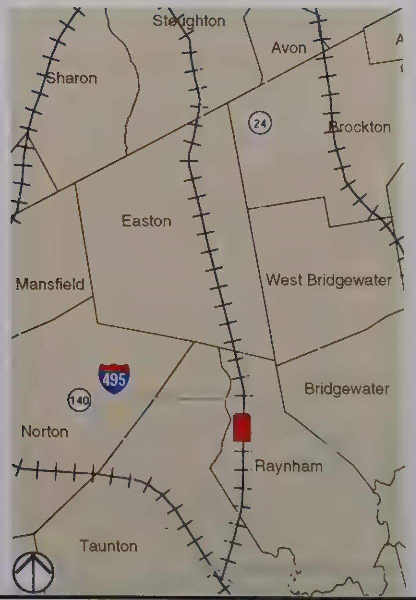
Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 16 of 23



- Proposed Track 1
- Proposed Track 2
- - - Right of Way
- Water
- Wetland Boundaries
- 🟦 Wetland Impact
- 100 Year Floodplain
- ☐ Historic District
- # Historic Resource
- Station Platform
- 🟩 Rare Species Habitat and Significant Natural Communities
- ▨ Estimated Habitat of Rare Wildlife
- ▨ DEP Approved Zone II Well Head Protection Area
- ☐ Air Quality Microscale Intersections
- # Noise Monitoring Locations
- # Potential Hazardous Materials Site



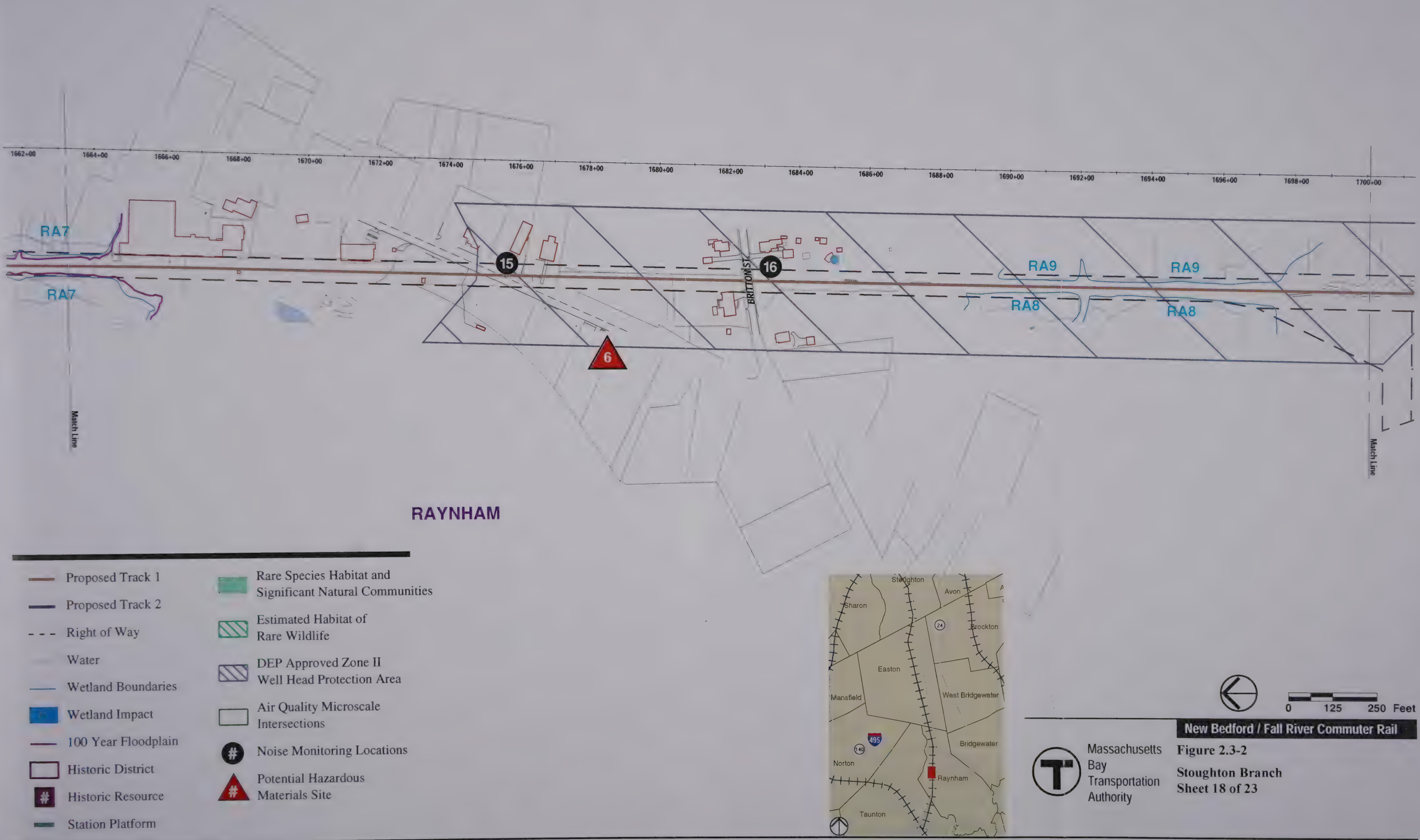
0 125 250 Feet

New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 17 of 23



New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 18 of 23

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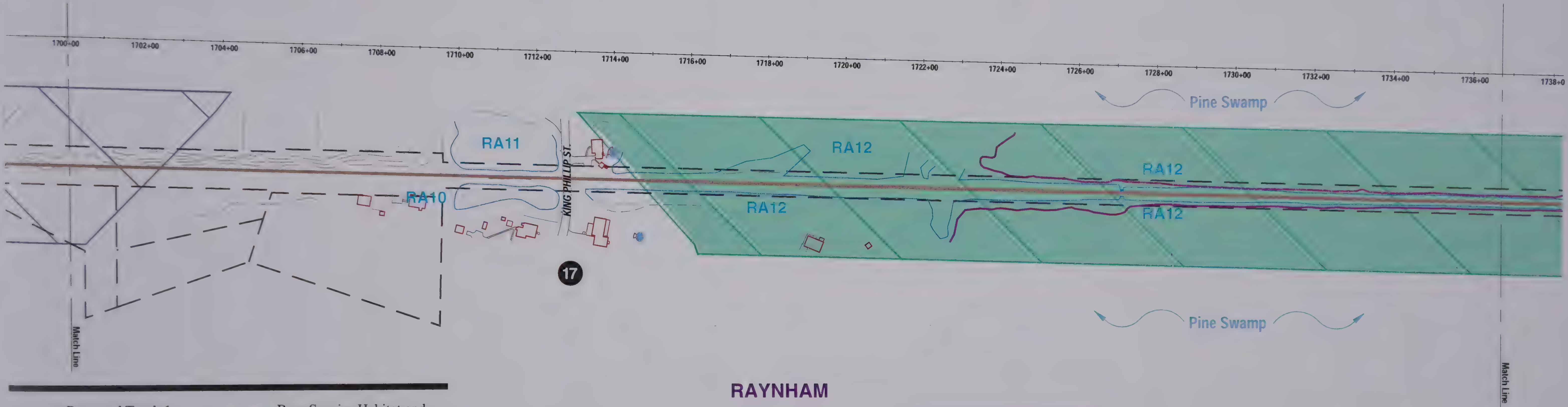
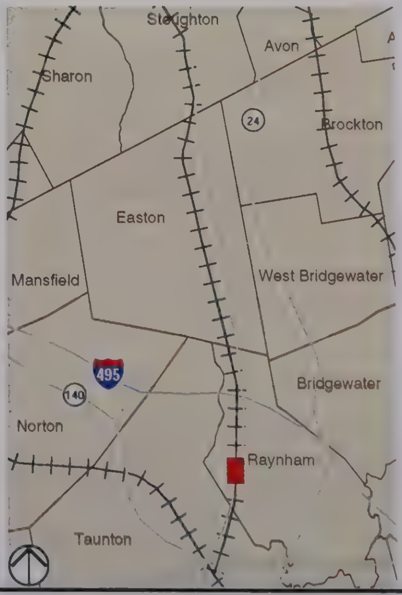


- Proposed Track 1
- Proposed Track 2
- - - - Right of Way
- Water
- Wetland Boundaries
- 🟦 Wetland Impact
- 100 Year Floodplain
- ☐ Historic District
- # Historic Resource
- Station Platform
- 🟩 Rare Species Habitat and Significant Natural Communities
- ▨ Estimated Habitat of Rare Wildlife
- ▨ DEP Approved Zone II Well Head Protection Area
- ☐ Air Quality Microscale Intersections
- # Noise Monitoring Locations
- # Potential Hazardous Materials Site



0 125 250 Feet

New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 19 of 23

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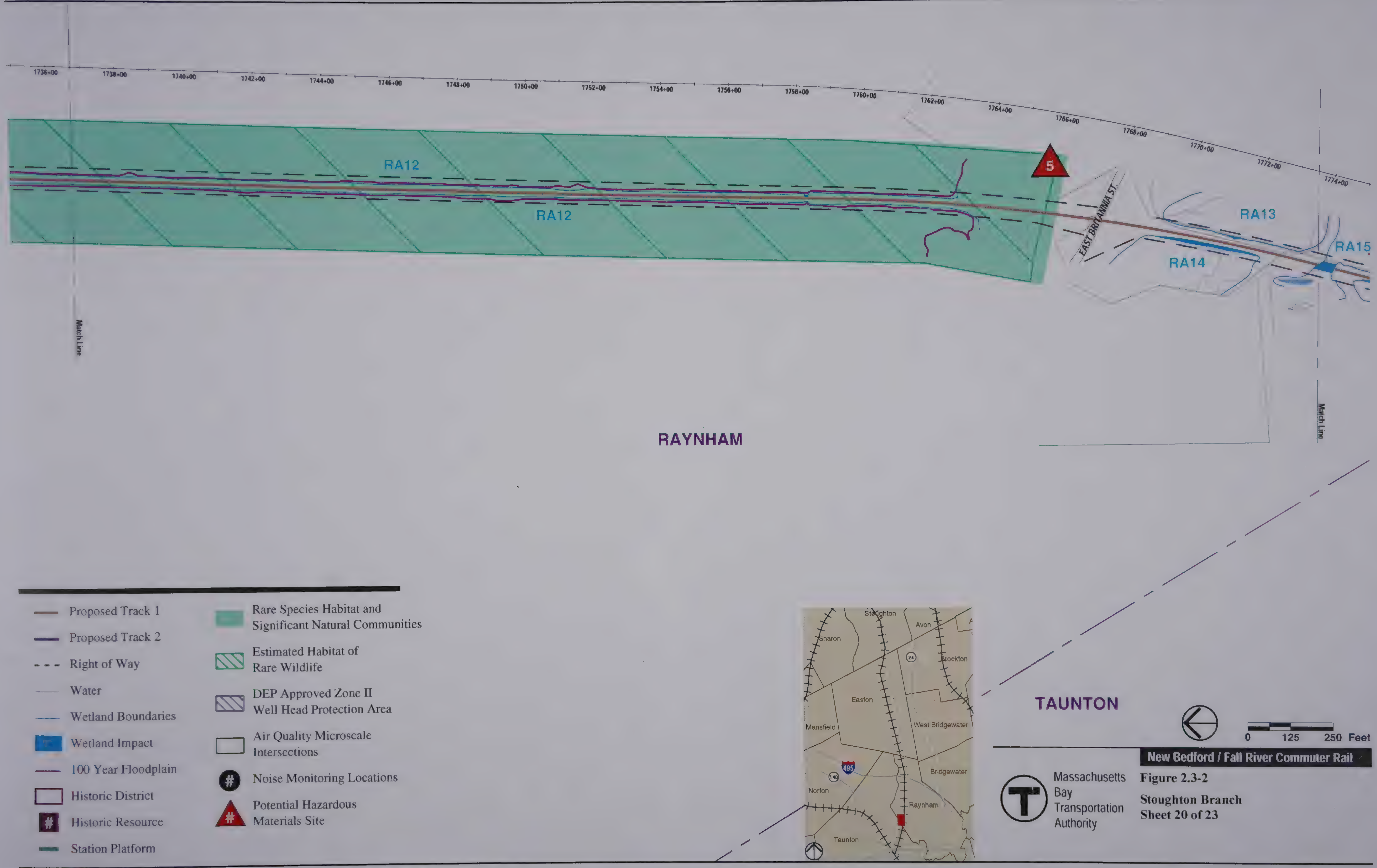
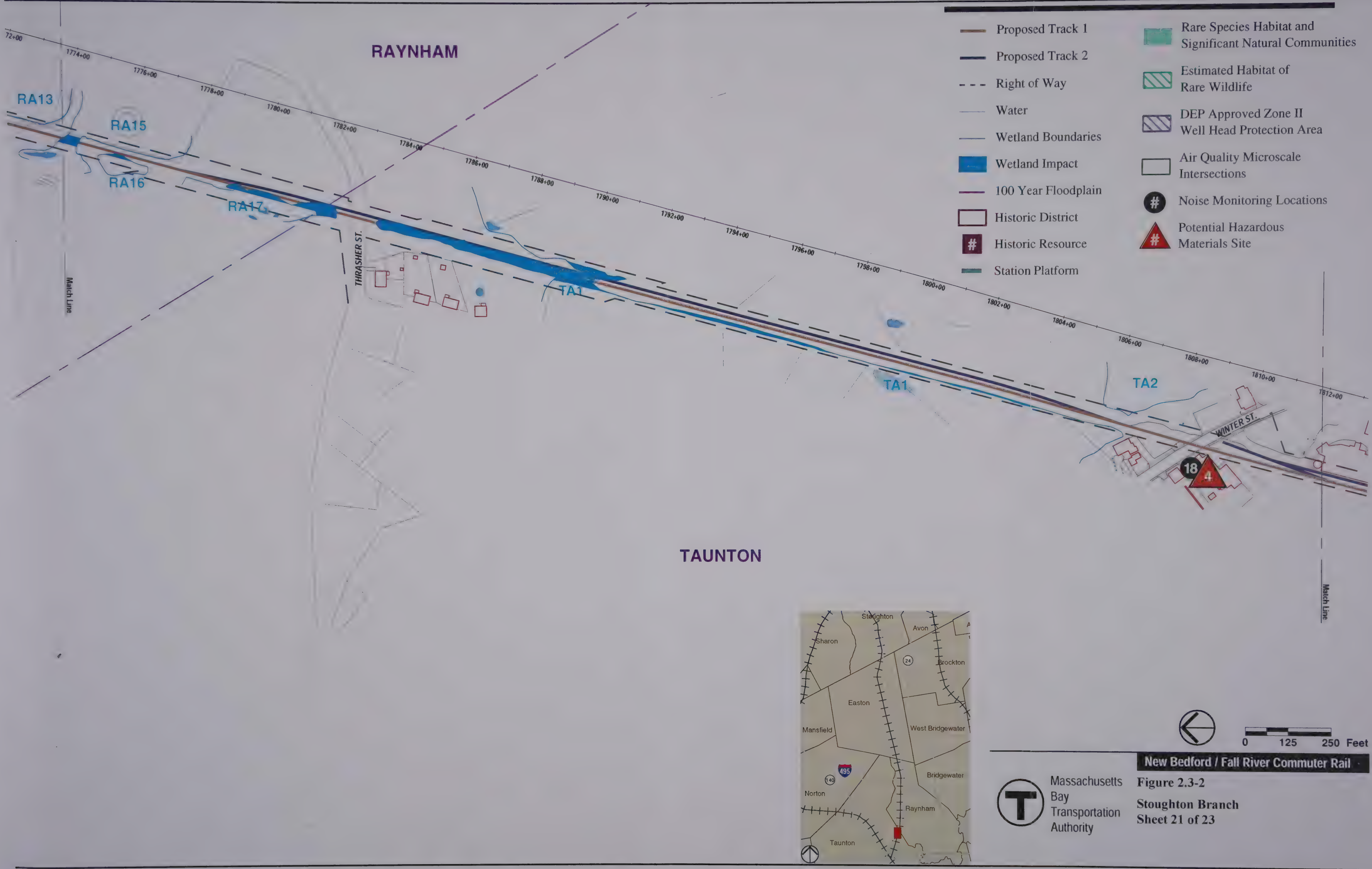


New Bedford / Fall River Commuter Rail

Massachusetts Bay Transportation Authority

Figure 2.3-2
Stoughton Branch
Sheet 20 of 23

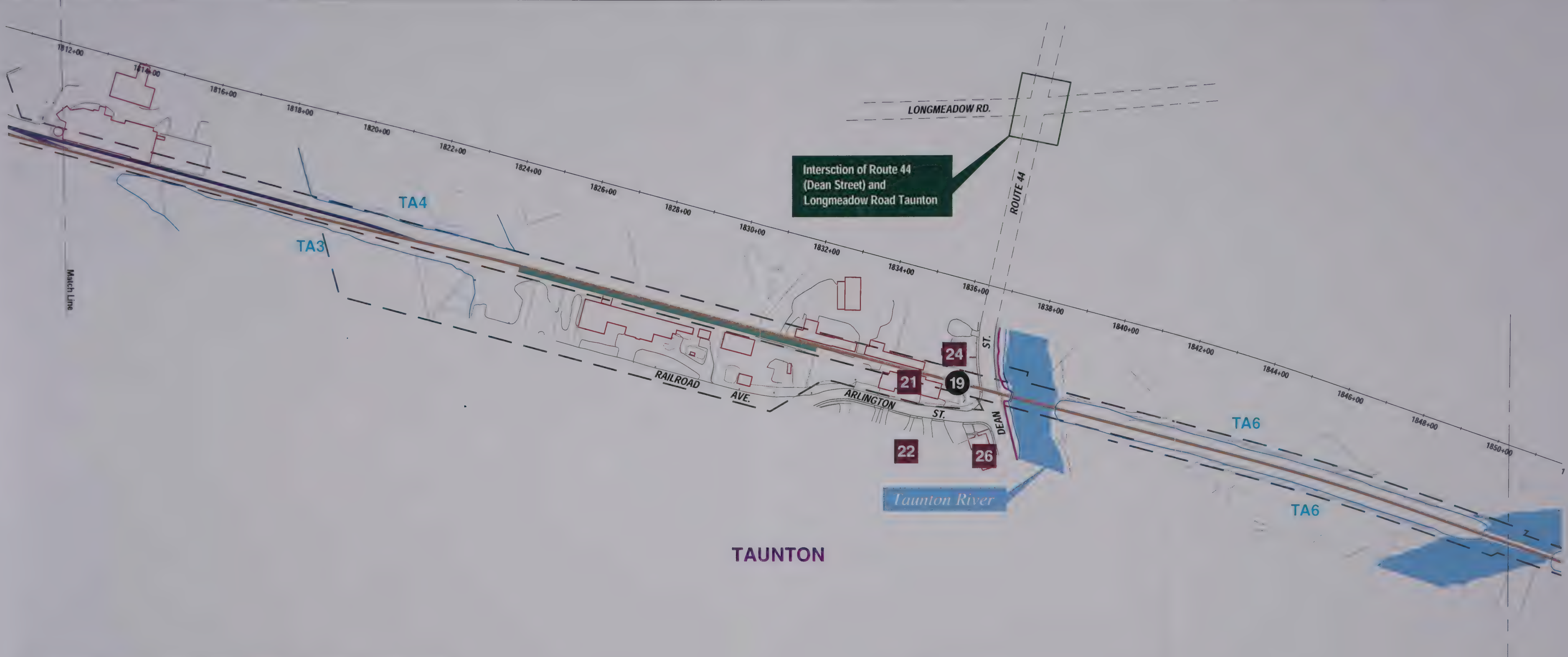


New Bedford / Fall River Commuter Rail

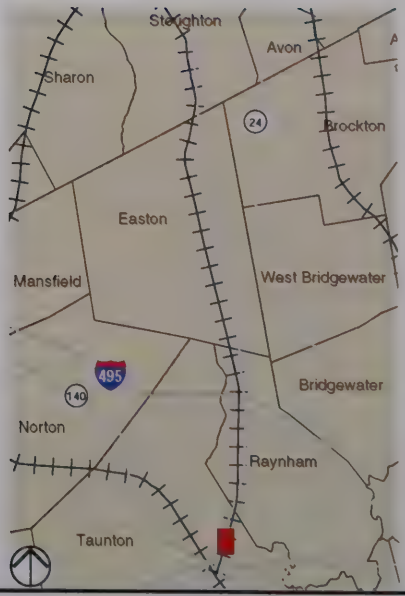
Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 21 of 23



- ▬ Proposed Track 1
- ▬ Proposed Track 2
- - - - Right of Way
- — Water
- — Wetland Boundaries
- 🟦 Wetland Impact
- — 100 Year Floodplain
- ☐ Historic District
- # Historic Resource
- ▬ Station Platform
- 🟩 Rare Species Habitat and Significant Natural Communities
- ▨ Estimated Habitat of Rare Wildlife
- ▨ DEP Approved Zone II Well Head Protection Area
- ☐ Air Quality Microscale Intersections
- # Noise Monitoring Locations
- # Potential Hazardous Materials Site



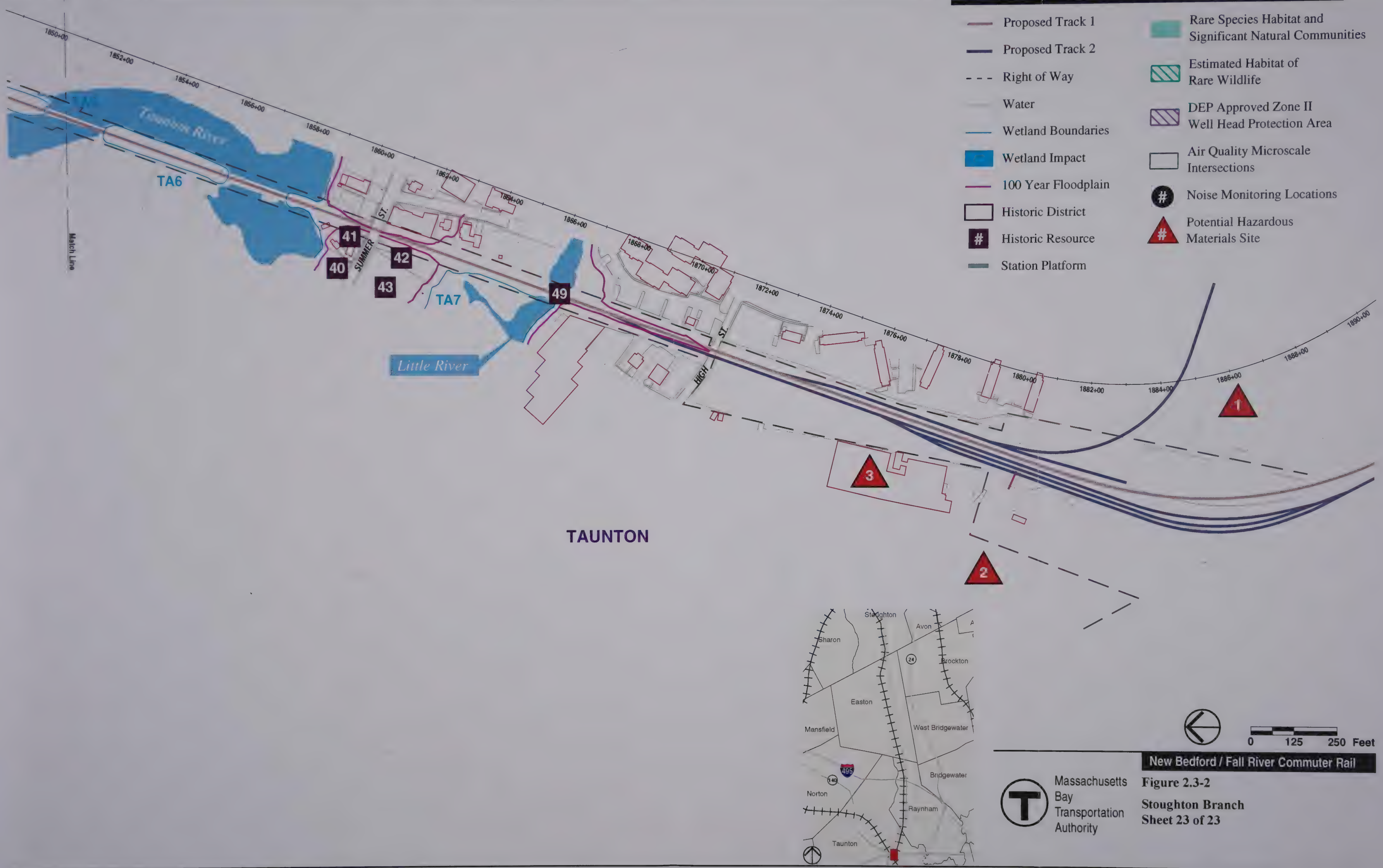
0 125 250 Feet

New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-2

Stoughton Branch
Sheet 22 of 23

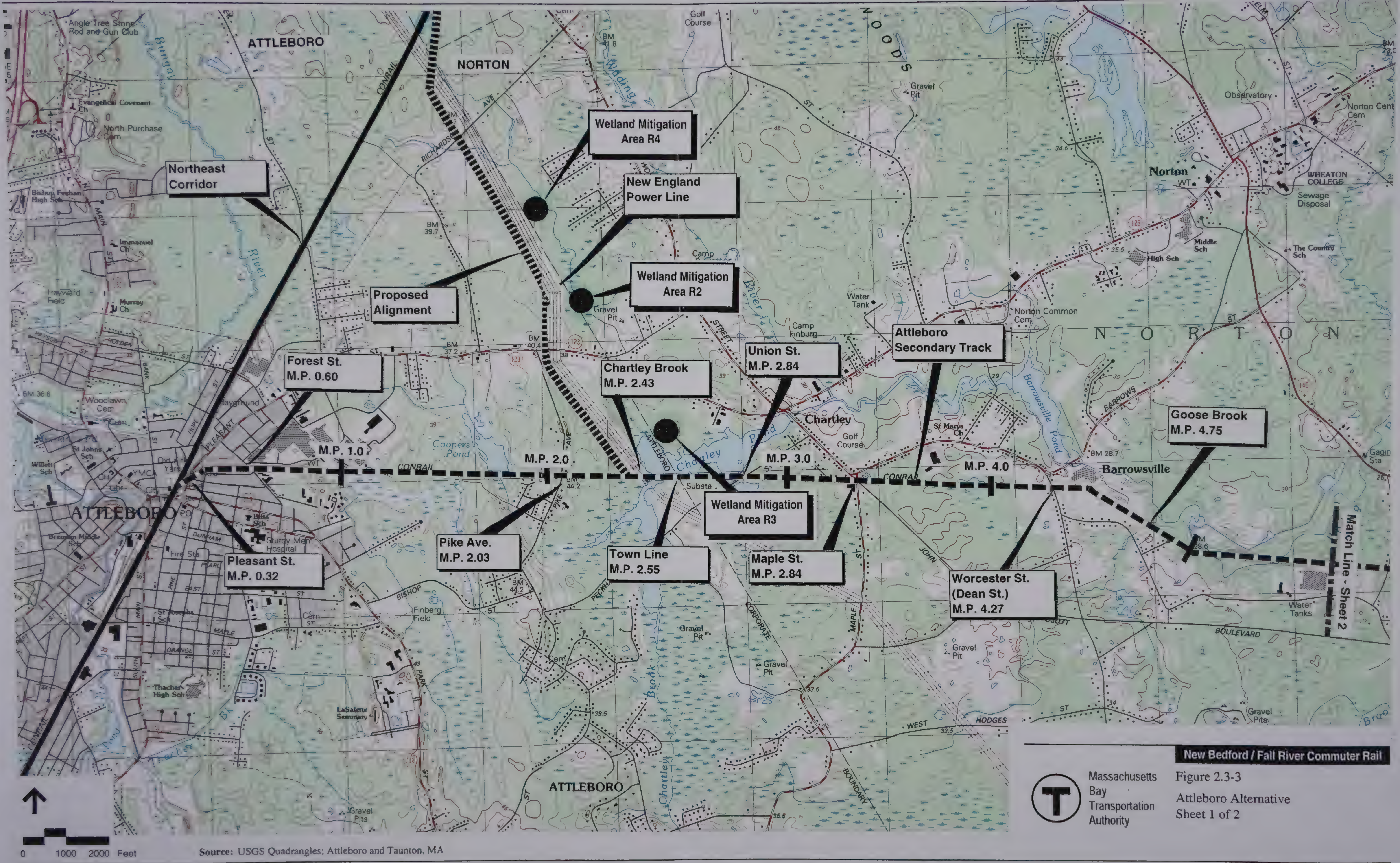


New Bedford / Fall River Commuter Rail

Massachusetts Bay Transportation Authority

Figure 2.3-2

Stoughton Branch
Sheet 23 of 23



Source: USGS Quadrangles; Attleboro and Taunton, MA

New Bedford / Fall River Commuter Rail

Massachusetts Bay Transportation Authority

Figure 2.3-3

Attleboro Alternative
Sheet 1 of 2

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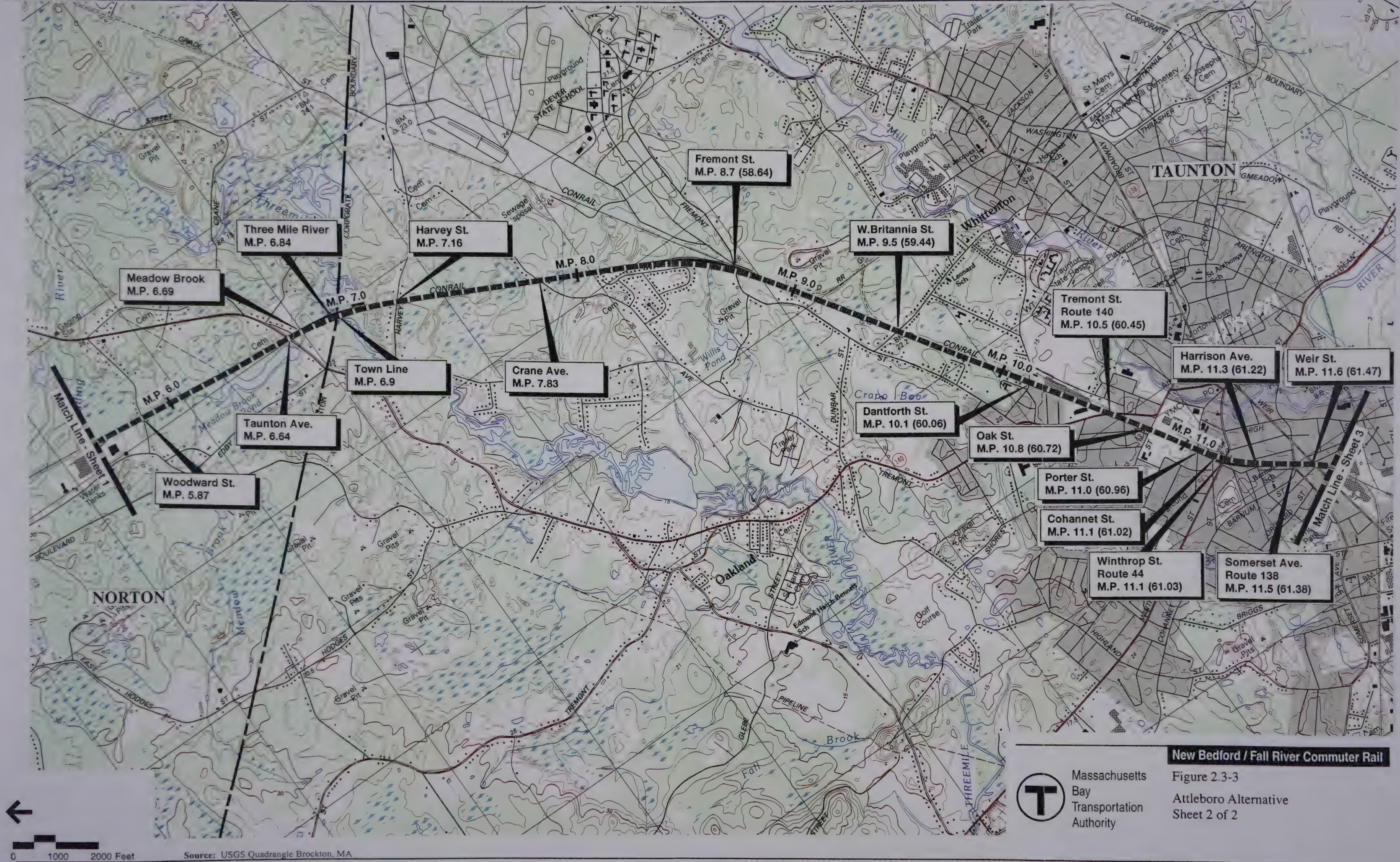

New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-3

Attleboro Alternative
Sheet 2 of 2

Source: USGS Quadrangle Brockton, MA

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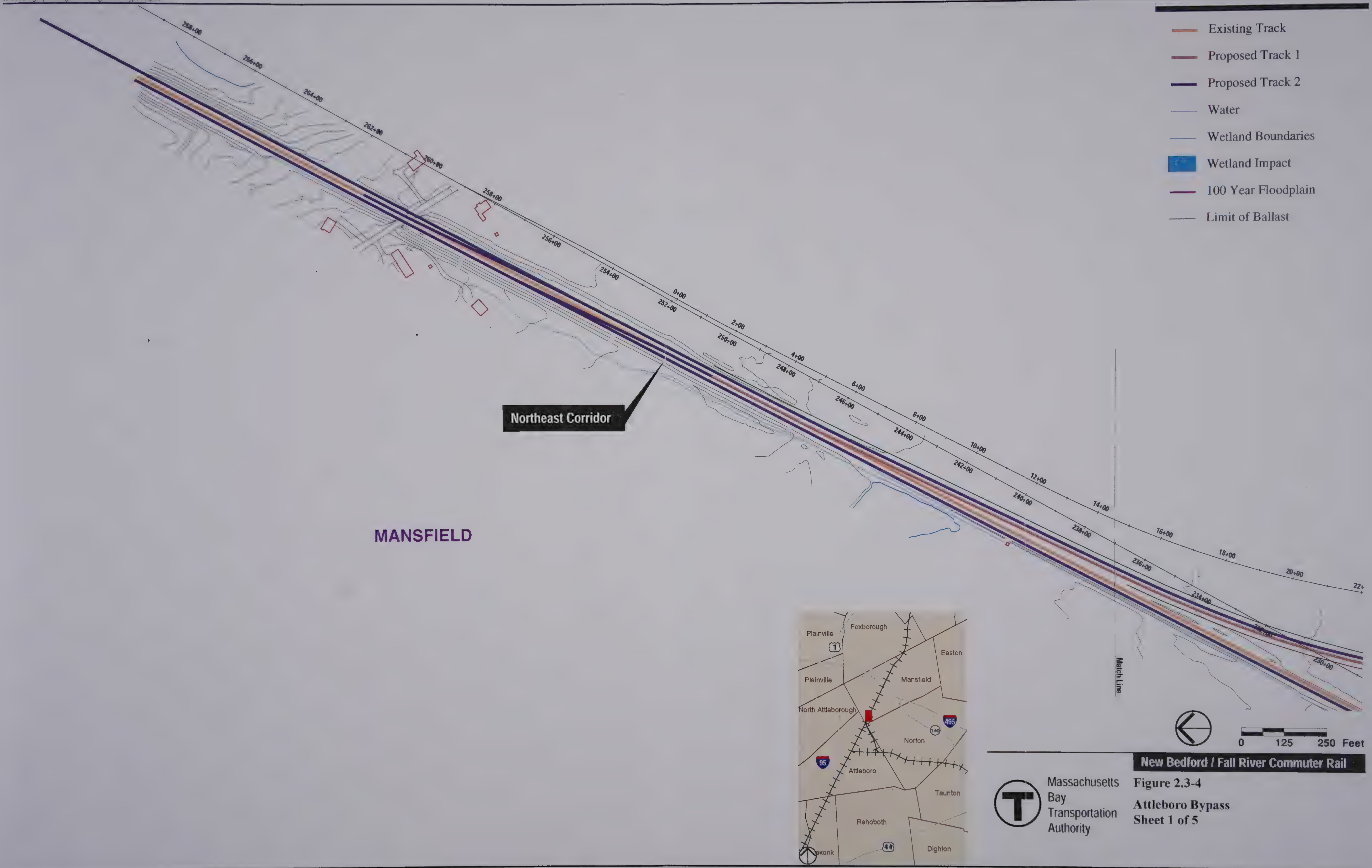

New Bedford / Fall River Commuter Rail

Massachusetts Bay Transportation Authority

Figure 2.3-4

Attleboro Bypass
Sheet 1 of 5

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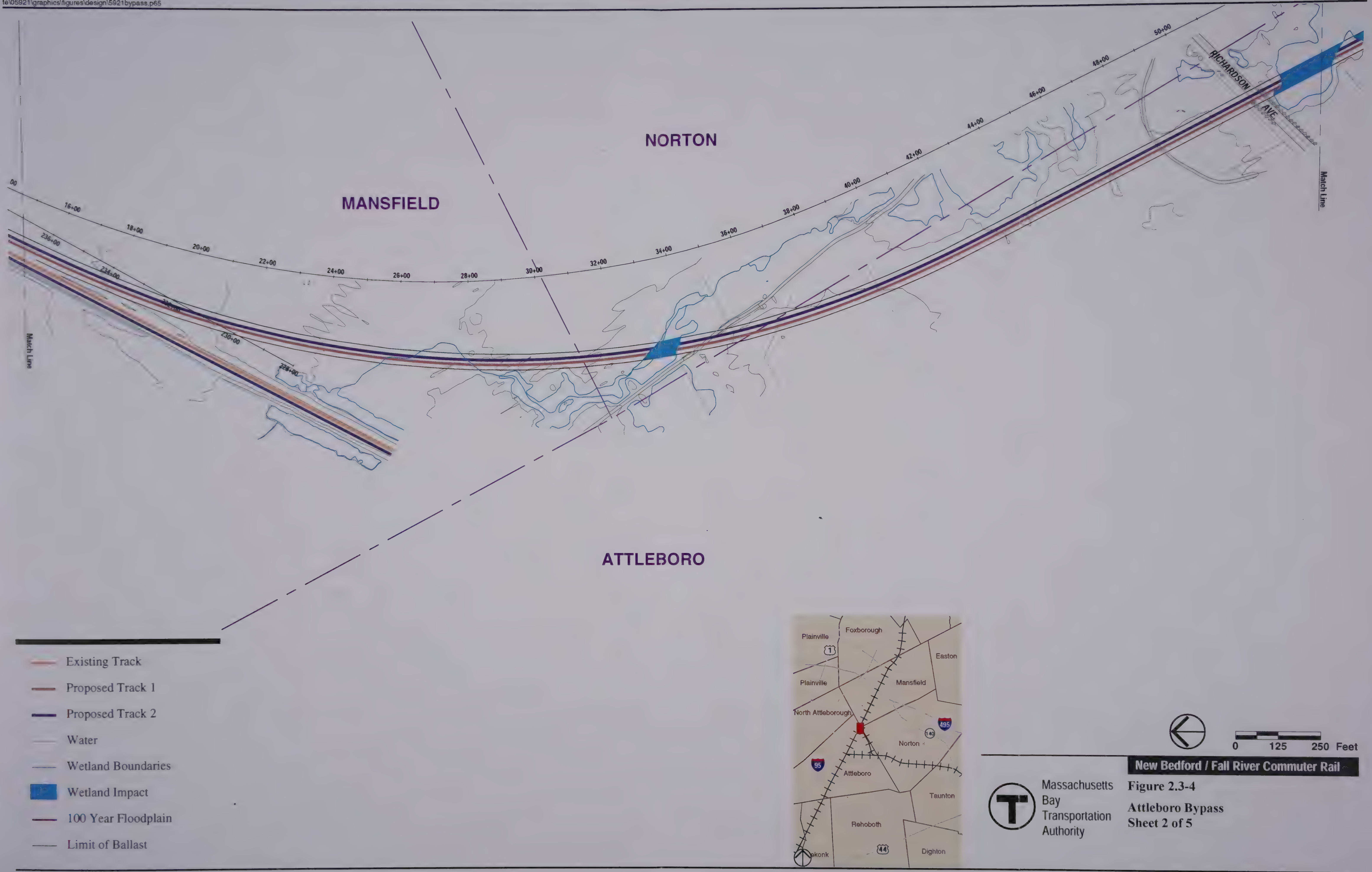

New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-4

Attleboro Bypass
Sheet 2 of 5

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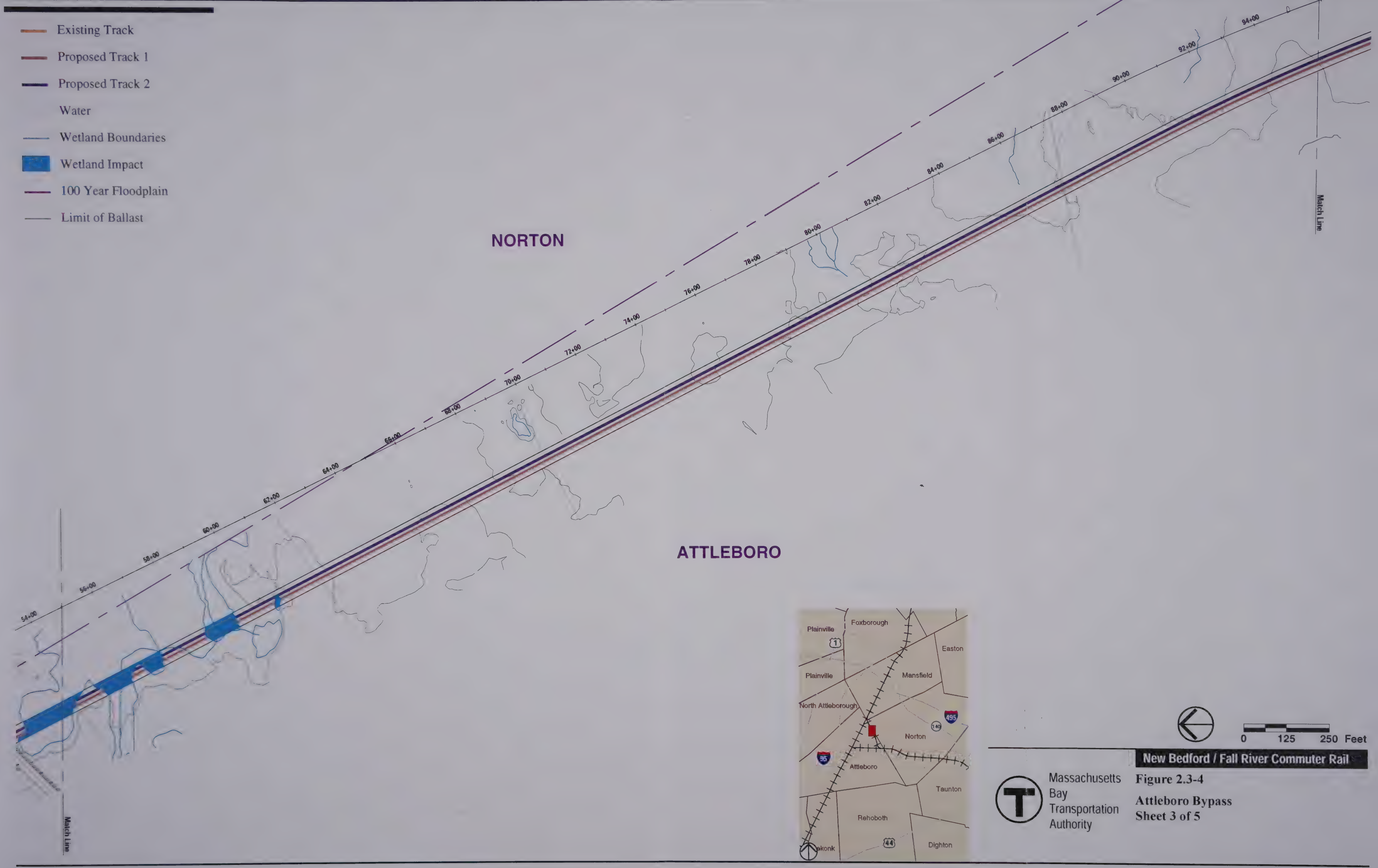
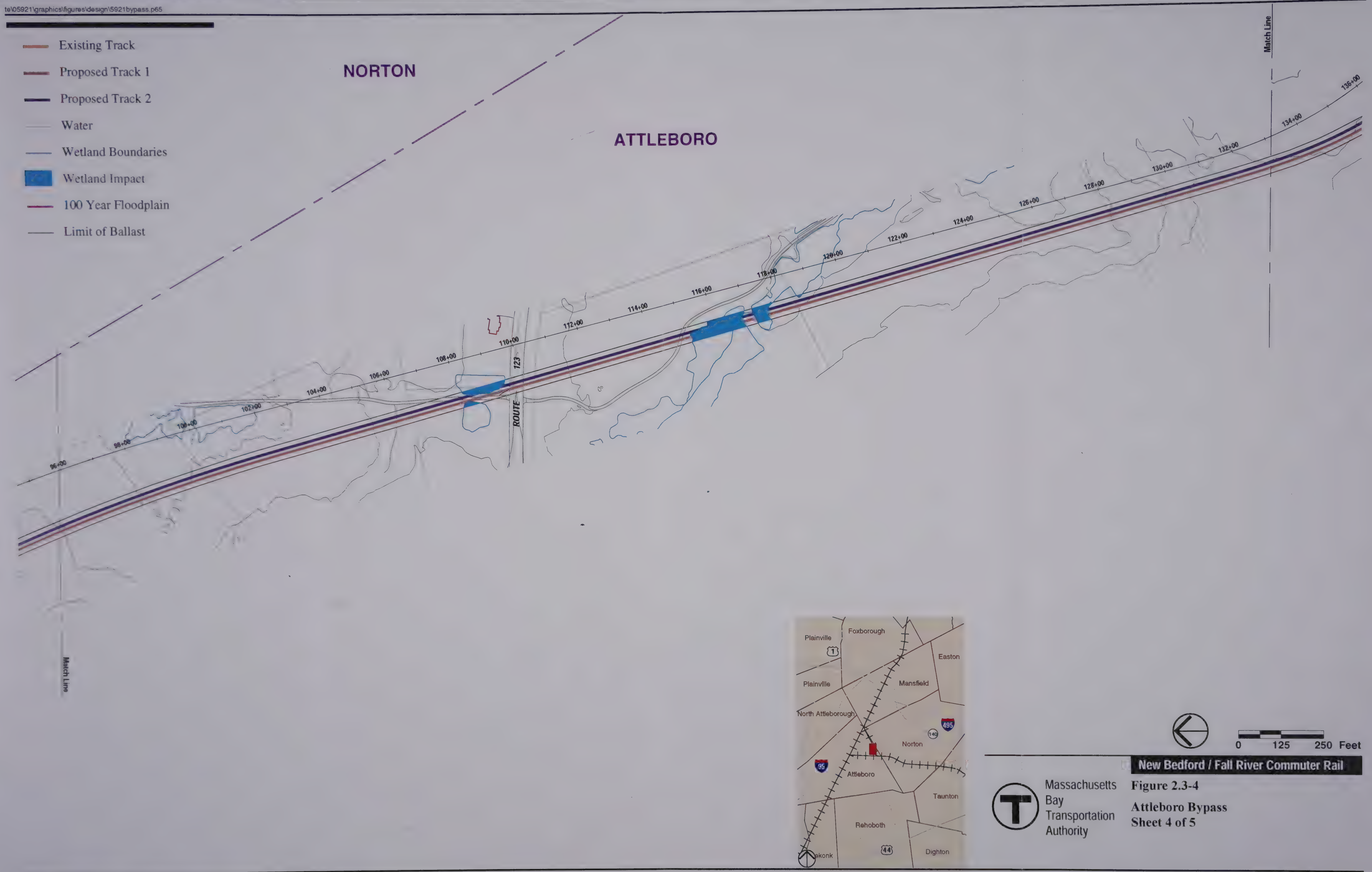


New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-4

Attleboro Bypass
Sheet 3 of 5



New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-4

Attleboro Bypass
Sheet 4 of 5

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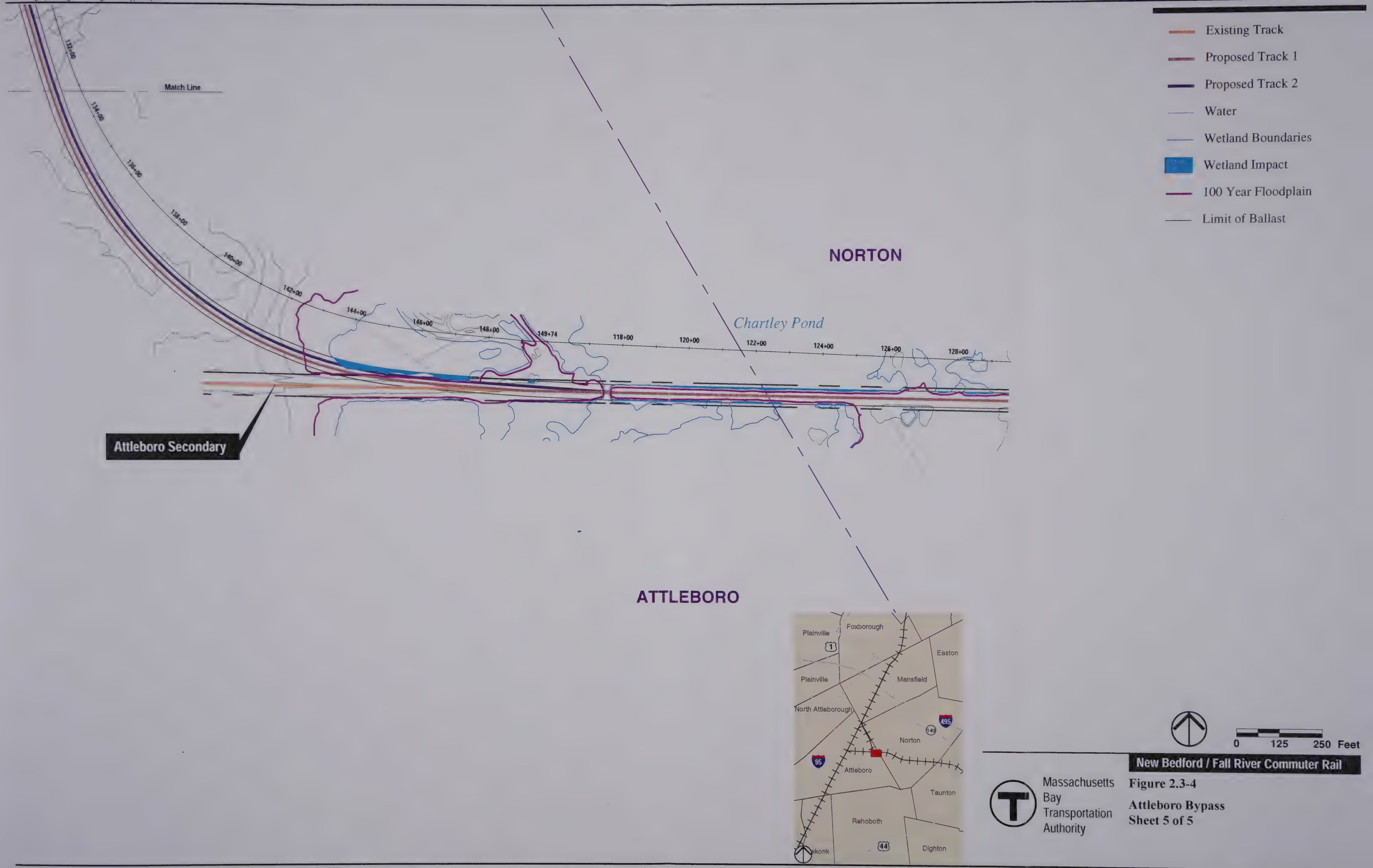


New Bedford / Fall River Commuter Rail

Massachusetts
Bay
Transportation
Authority

Figure 2.3-4

Attleboro Bypass
Sheet 5 of 5

2.4.2 Freetown Station

The proposed Freetown commuter rail station has been relocated to a site off Ridge Hill Road in Freetown, to provide convenient access to rail service for residents of the local area (See Figure 2.4-1 and 2.4-2). The station site will occupy approximately 6 acres of land at the Route 24/South Main Street interchange. Access to the station site will be off Ridge Hill Road, immediately east of the Route 24 overpass. The undeveloped commercial/industrial site will be developed for approximately 450 parking spaces.

2.4.3 Battleship Cove Station

The Battleship Cove station proposed in the ENF was subsequently determined to be infeasible due to conflicts with existing freight use of the yards at Battleship Cove. The station was subsequently moved south to a location off of Water Street, south of Anawan Street (Figures 2.4-3 and 2.4-4). The station will primarily function as a walk-in and drop-off station, with parking for 6 cars.

2.4.4 Tracks at East Taunton Station

The new track layout proposed at the East Taunton Station site consists of three tracks to accommodate both commuter rail and freight operations (See Figure 2.4-5). This area is referred to as "Cotley Junction" and is the location for CSX freight train movements from the Attleboro Secondary to the Middleborough Secondary. At this critical juncture, freight trains layover on the tracks during the day for a significant period of time. In order to ensure that commuter rail operations are not interrupted, two additional tracks are required at this location. One track will be dedicated to MBTA commuter rail operations, CSX and the MBTA will share one track, and one track will be dedicated to freight.

The station platform at this location will be a high level center platform, 800 feet in length, located between the two easternmost tracks. The westernmost track will be designated for exclusive freight use. The proposed length of the three-track area is approximately 5,000 ft.

2.4.5 Myricks Junction Track Improvements

Design of the Myricks Junction track improvements subsequent to the ENF revealed that three additional properties will need to be acquired, since track improvements and operations will eliminate their access (See Figure 2.4-6). The two tracks through this area will be raised by 3 feet. This area's full super-elevation is required to permit the 45 MPH merging train operations from the Fall River Secondary to the New Bedford Main Line of Myricks Junction. Because of this, it is impossible to safely maintain the grade crossings and roadways at this location to access the private properties. Consequently, two parcels of land located at Mills Lane are surrounded by railroad right of way; that is, the properties are located in the middle of an old wye track configuration. Mill Street Parcel No. 1 is approximately 2.65 acres and Parcel No. 2, which is the southernmost parcel is approximately 3.39 acres. There are two dwellings on the northern parcel and one dwelling on the southern parcel. Adams Lane provides the only access to Parcel No. 3 located on the east side of the Fall River Secondary. One dwelling is located at this location which abuts the railroad right-of-way on the west Side.

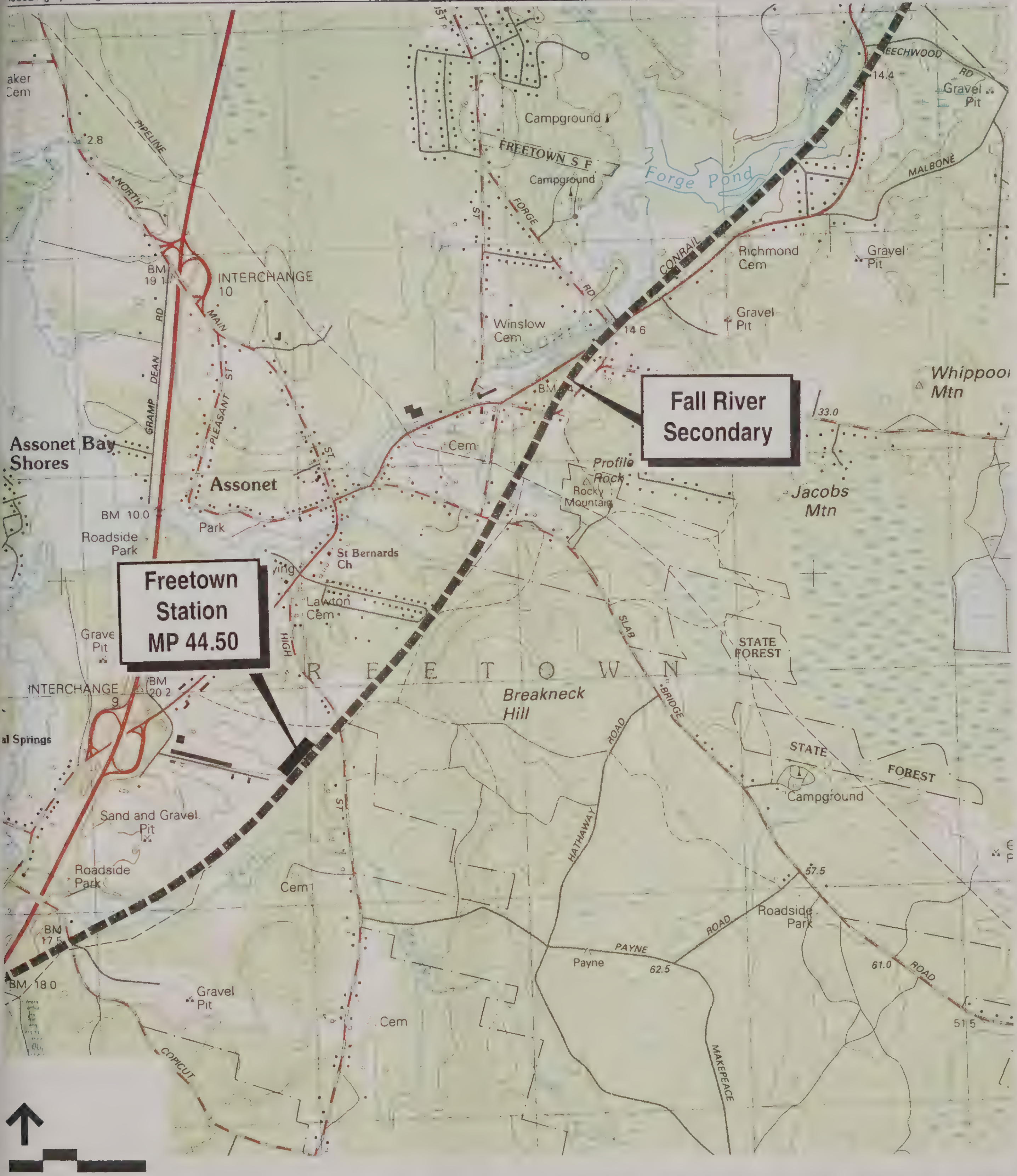
2.5 Project Elements

This section provides detailed descriptions of the infrastructure improvements, commuter rail stations, and operations of the New Bedford/Fall River Commuter Rail Extension, particularly for the Stoughton Branch (the 16 miles between Brock Street in Stoughton and Weir Junction in Taunton). Detailed information on the project elements south of Weir Junction in Taunton was provided in the ENF.

The Stoughton Alternative, presented in this Draft EIR as the MBTA's preferred alternative is an extension of the existing Stoughton Line service. Service would be provided at the existing Back Bay, Canton Junction, and Stoughton stations, and at new station stops located in North Easton, Raynham, Dean Street (Taunton), East Taunton, Freetown, Fall River, Battleship Cove, Fall River and New Bedford. A layover facility would be constructed in New Bedford, as described in the ENF. The MBTA is currently evaluating alternative locations in Freetown to relocate the proposed Fall River Layover facility.

This DEIR evaluates the Stoughton Branch, which was not evaluated in detail in the ENF. This alternative would require the reconstruction of 14 miles of currently inactive track right-of-way from Brock Street, Stoughton to north of Winter Street in Taunton, and the upgrading and rehabilitation of 2 miles of existing active freight rail lines from Winter Street to Weir Junction in Taunton. Three new stations, also not evaluated in the ENF, would be constructed along the Stoughton Branch: North Easton, Raynham, and Dean Street (Taunton).

This DEIR also provides information on project elements that have been modified subsequent to the publication of the 1995 ENF, which include relocation of the proposed Battleship Cove and Freetown Stations, and modifications to the track layout in some locations.



Freetown Station MP 44.50

Fall River Secondary

Source: USGS Quadrangle; Somerset, MA

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Freetown Station
Site Location Map

Figure 2.4-1

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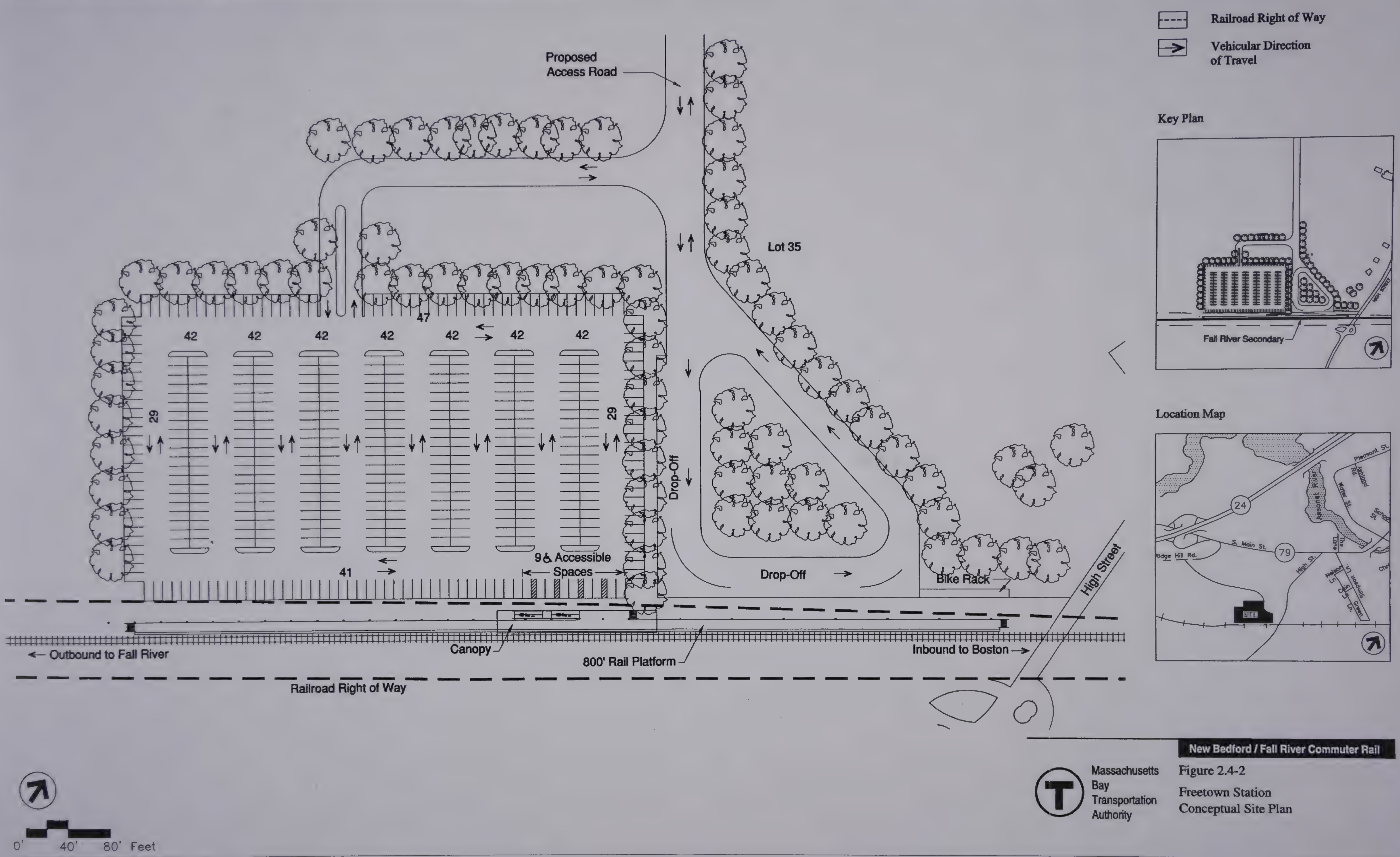

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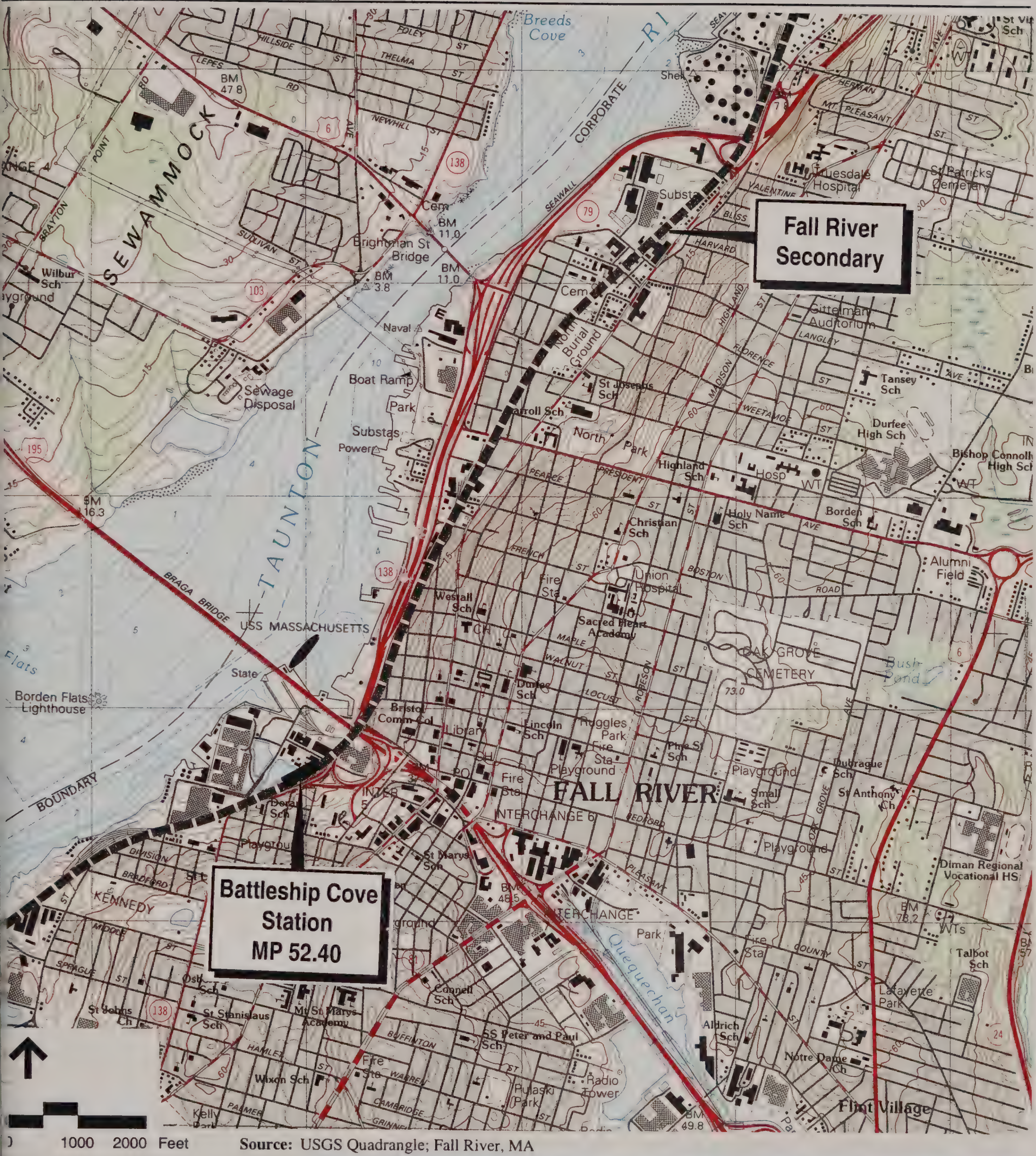
Massachusetts Bay Transportation Authority

Figure 2.4-2

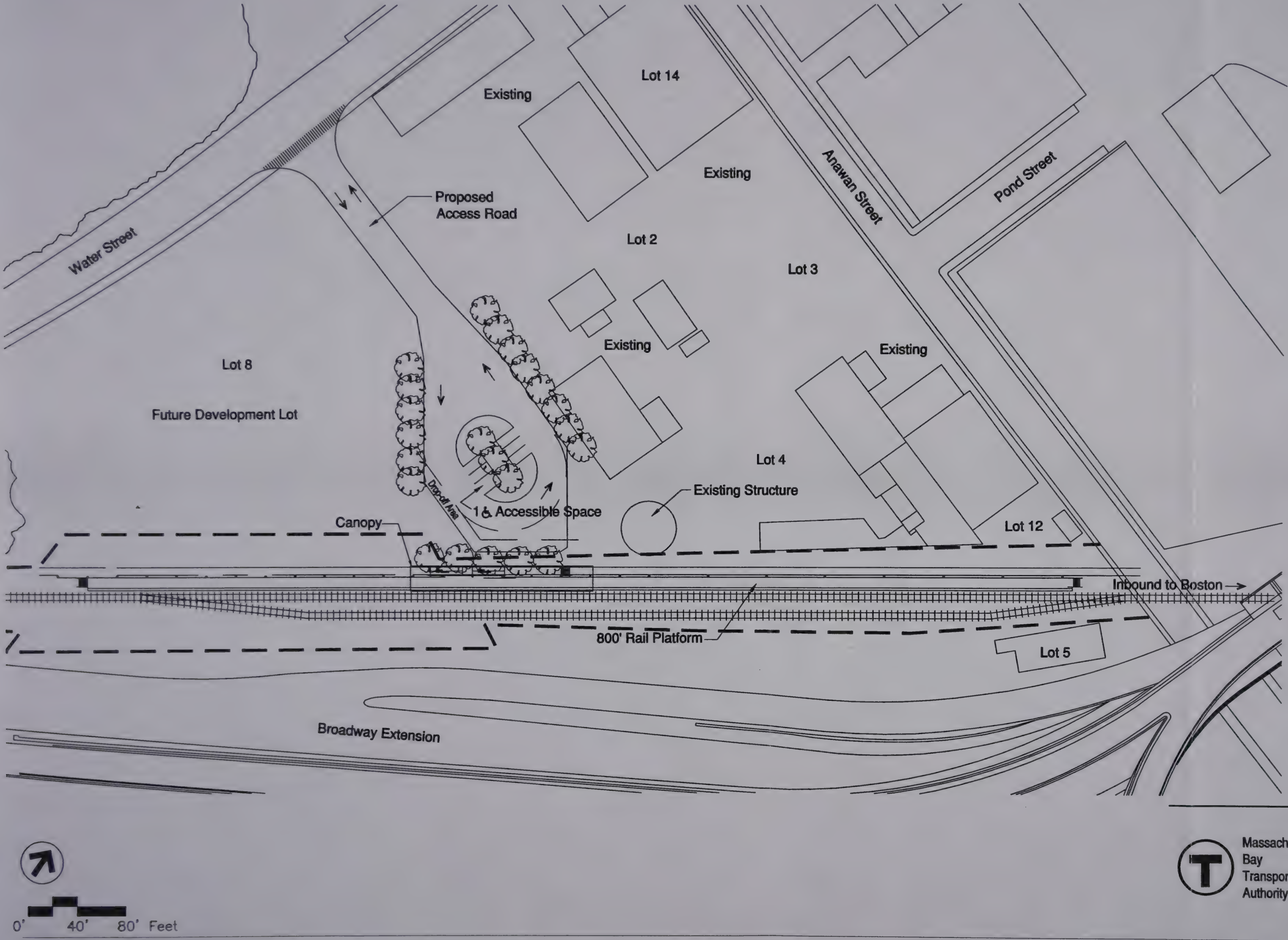
Freetown Station Conceptual Site Plan



Source: USGS Quadrangle; Fall River, MA

Battleship Cove Station
Site Location Map

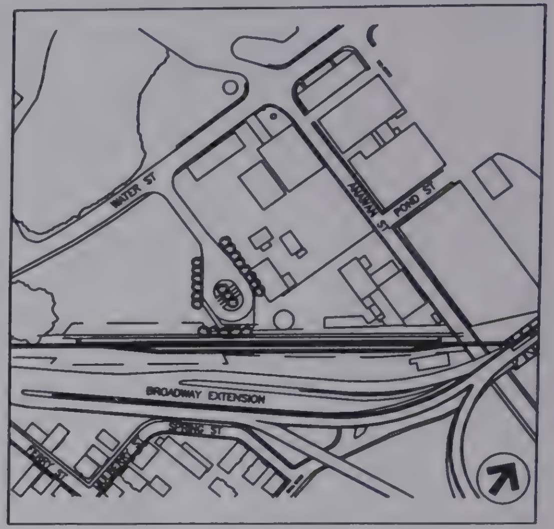
Figure 2.4-3



- - - - Railroad Right of Way

→ Vehicular Direction of Travel

Key Plan



Location Map

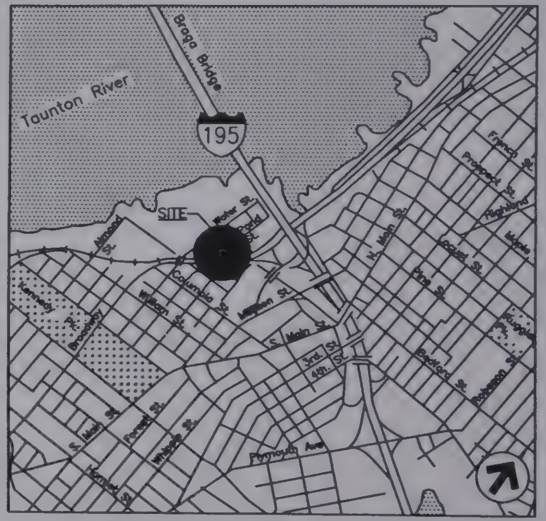


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Figure 2.4-4

Battleship Cove
Conceptual Site Plan

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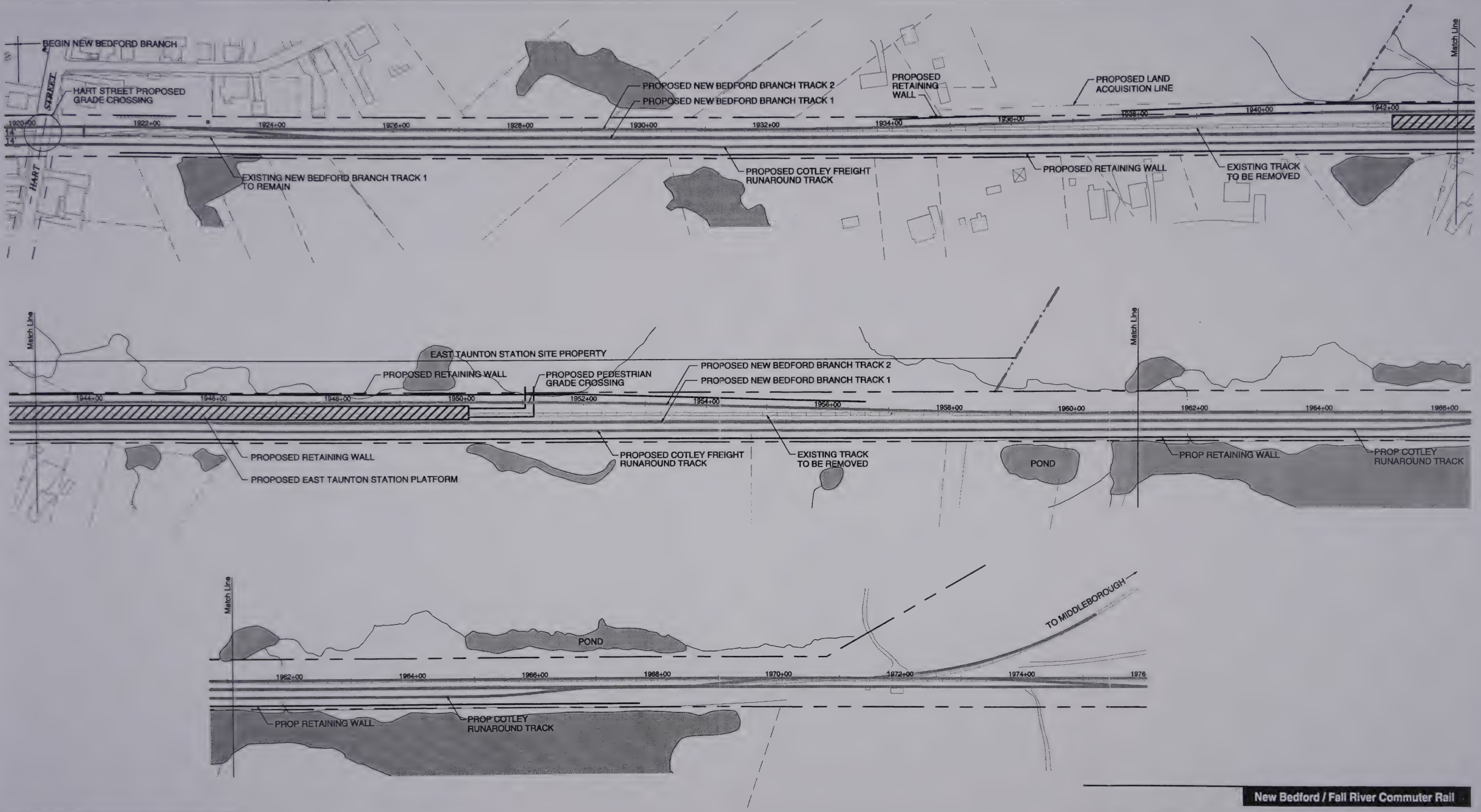
BEGIN NEW BEDFORD BRANCH
HART STREET PROPOSED GRADE CROSSING
STREET
HART
1920+00
1922+00
1924+00
1926+00
1928+00
1930+00
1932+00
1934+00
1936+00
1938+00
1940+00
1942+00
14'
14'
PROPOSED NEW BEDFORD BRANCH TRACK 2
PROPOSED NEW BEDFORD BRANCH TRACK 1
PROPOSED RETAINING WALL
PROPOSED LAND ACQUISITION LINE
Match Line
EXISTING NEW BEDFORD BRANCH TRACK 1 TO REMAIN
PROPOSED COTLEY FREIGHT RUNAROUND TRACK
PROPOSED RETAINING WALL
EXISTING TRACK TO BE REMOVED
Match Line
EAST TAUNTON STATION SITE PROPERTY
PROPOSED RETAINING WALL
PROPOSED PEDESTRIAN GRADE CROSSING
PROPOSED NEW BEDFORD BRANCH TRACK 2
PROPOSED NEW BEDFORD BRANCH TRACK 1
1944+00
1946+00
1948+00
1950+00
1952+00
1954+00
1956+00
1958+00
1960+00
1962+00
1964+00
1966+00
Match Line
PROPOSED RETAINING WALL
PROPOSED EAST TAUNTON STATION PLATFORM
PROPOSED COTLEY FREIGHT RUNAROUND TRACK
EXISTING TRACK TO BE REMOVED
POND
PROP RETAINING WALL
PROP COTLEY RUNAROUND TRACK
Match Line
POND
TO MIDDLEBOROUGH
1962+00
1964+00
1966+00
1968+00
1970+00
1972+00
1974+00
1976
PROP RETAINING WALL
PROP COTLEY RUNAROUND TRACK

═ Existing Track

— Proposed Track

▨ Wetlands

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Figure 2.4-5

East Taunton Track Layout

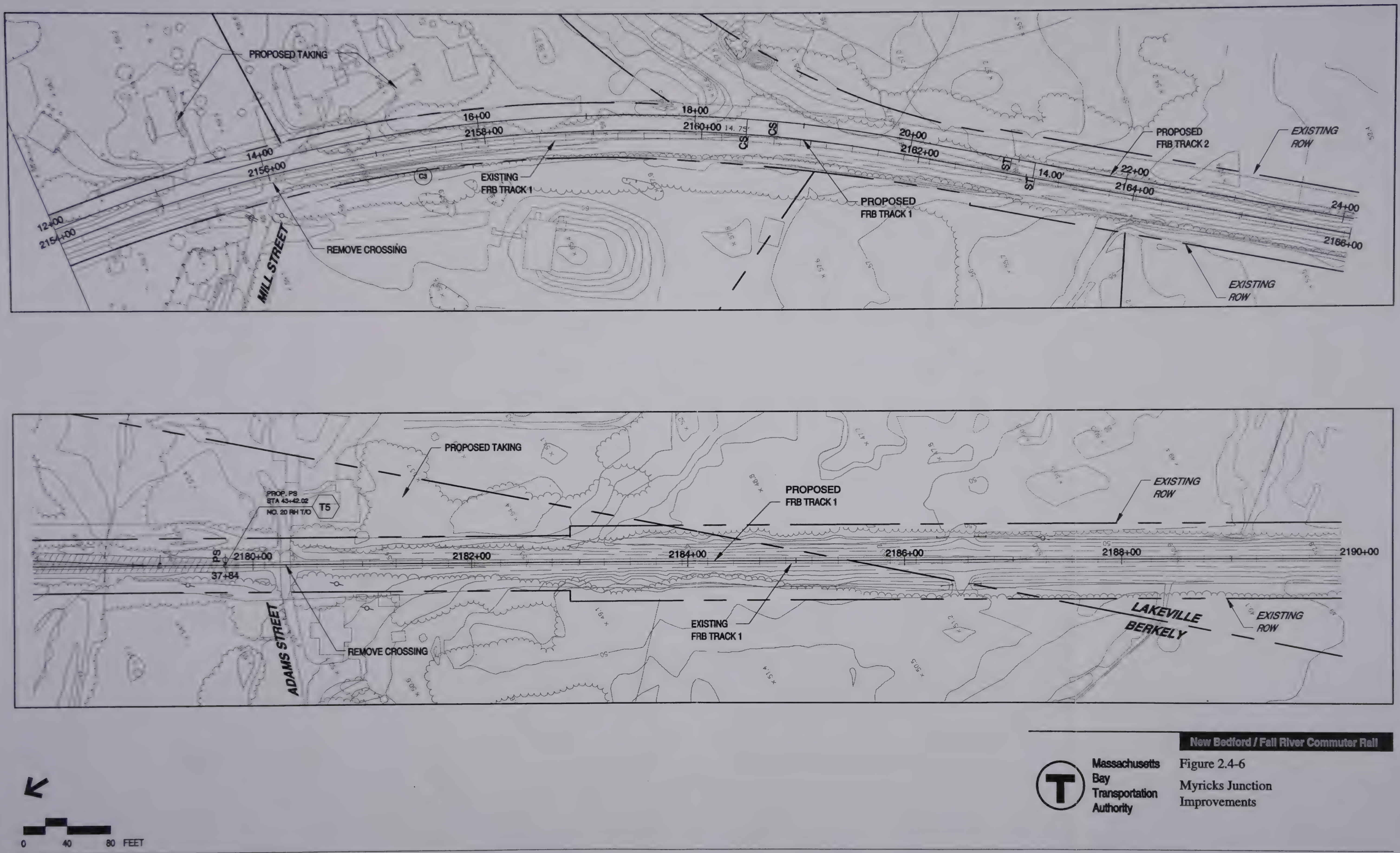

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Figure 2.4-6
Myricks Junction
Improvements

2.5.2 Infrastructure Improvements – Stoughton Branch

The existing railroad infrastructure consists of the track system, bridges, signal systems, and grade crossings. For the Stoughton Branch, it is discussed in relation to just south of the existing Stoughton Station (Brock Street) to Weir Junction in Taunton, north of Hart Street, where it connects to the New Bedford Main Line. The Stoughton Branch track has been out of service for nearly 40 years, with the exception of the segment from Winter Street in Taunton south to Weir Junction where there remains active freight service. Efficient and safe passenger and commuter rail service requires the Class 1 track to be upgraded to Class 4. (Class 4 track is a criteria established by the Federal Railroad Administration (FRA) which is based on maximum allowable operating speeds for passenger trains and freight. Class 4 track allows passenger equipment to operate at a maximum 79-MPH and freight at up to 60 MPH). Commuter rail service will operate at a maximum speed of 69 MPH. Class 4 design standards require improvements to the existing track, signals, grade crossings and bridges.

2.5.2.1 Track System

The MBTA owns the right-of-way through the towns of Stoughton, Easton and portions of Raynham, although numerous encroachments can be encountered along this right-of-way. Private property owners own sections of the right-of-way from Broadway in Raynham to Dean Street in Taunton. South of Dean Street to Weir Junction in Taunton is an active freight line, which is owned by EOTC. Bay Colony Railroad leases the rail from EOTC for its operation. This segment of track is used regularly by CSX and Bay Colony freight. The railbed, ties and rail are in poor condition (Class 1). CSXs' maximum authorized speed for this track is 10 MPH.

The tracks along the Stoughton Branch will be reconstructed to exceed Class 4 standards, using 132-lb continuous welded rail (CWR) and concrete ties. Replacement of the track bed, ballast, ties and rail, drainage systems and the construction of passing sidings are required (See Figure 2.5-1 for the MBTA Typical Cross Section). Double tracking is proposed from Brock Street in Stoughton to just north of Elm Street in Easton. Two passing sidings will also be installed. The first will be located at Raynham Station (6,648 l.f.) and the second will be located just south of East Brittania Street to a point just north of Winter Street in Taunton (2,980 l.f.)

Significant repairs and replacement of the existing railbed, ballast, ties, rail, and switches are required in order to allow safe operation of commuter rail service. These improvements are described in the following sections.

Existing Conditions

The Stoughton Branch from Brock Street in Stoughton south to Winter Street in Taunton is out of service. Consequently, most of the existing track has been removed. South of Winter Street to Weir Junction (north of Ingell Street), where the Stoughton Branch ends, has active freight service. Where track is existent, there are a variety of rail sizes. It generally consists of jointed rail rolled in the 1920s. There are virtually no ties visible on the Stoughton Branch between Stoughton and Easton. Ballast on the rest of the line typically consists of cinders and slag and is minimal to non-existent. The existing freight track is in poor condition and requires complete replacement to accommodate passenger rail. Several culverts on the out-of-service sections have been washed out or removed. Slope stability is generally good and existing embankments in most areas have sufficient width to support commuter rail service.

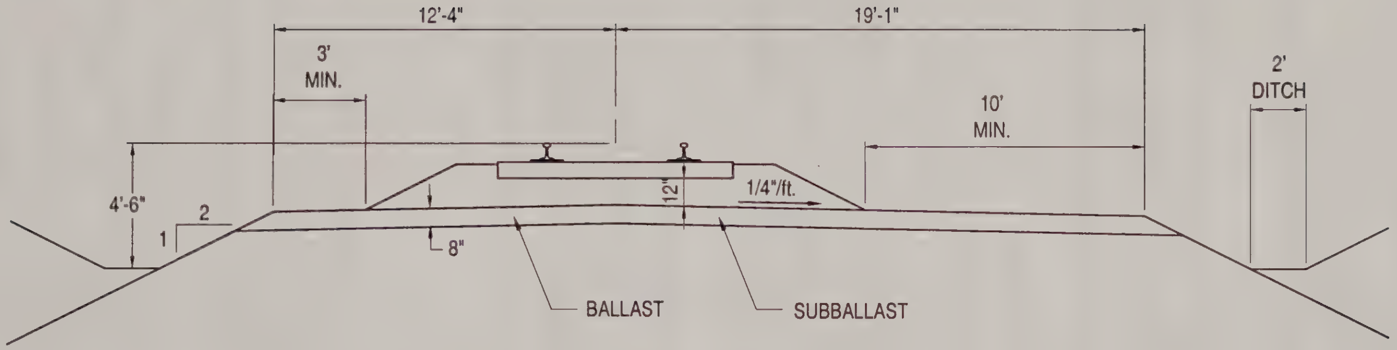
Need for Improvements

In order to operate a commuter rail service safely and efficiently several improvements to the track structure must be made. The existing 107-lb jointed rail along with the cross ties and other track material (OTM), i.e., joint bars, bolts, spikes, plates and clamps, are all well beyond their useful serviceable life and inadequate to support commuter rail service. Any attempt to use this track at higher speeds than it is presently being operated on would represent a safety hazard and would not be permitted by the FRA. Most existing trackside ditches are silted full and have extensive vegetation growth due to lack of maintenance. This restricts the free flow of stormwater runoff and consequently allows the track bed to become saturated and the ballast to become fouled with silt and fines. When railroad embankments become saturated and subjected to vibration by trains operating on jointed track, liquefaction can occur and consequently cause embankment failures.

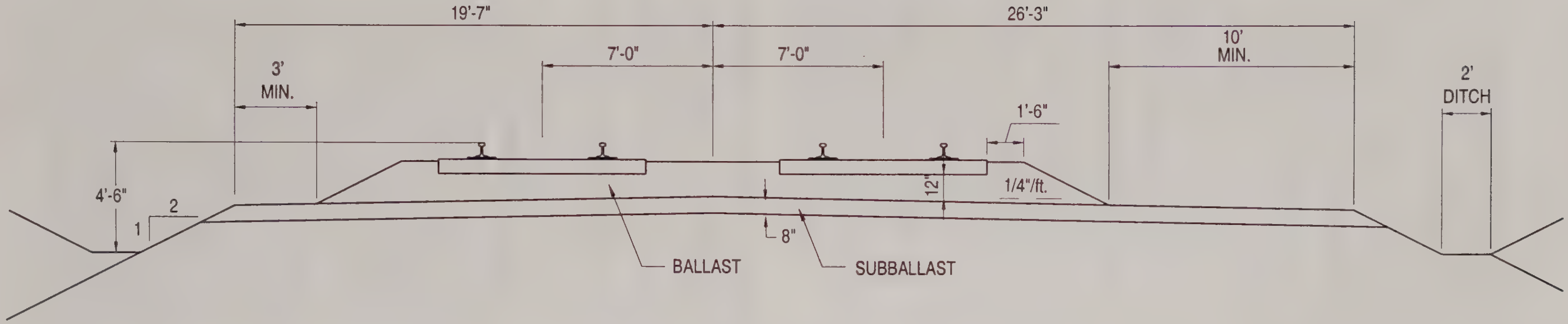
Proposed Work

The proposed improvements on the Stoughton Branch consists of rehabilitation of the track bed, ditches, ballast, ties and rail, and the construction of passing sidings. These improvements include the following elements:

- Embankment slope stability will be corrected in areas by the addition of riprap or gabions to prevent further spot erosion.
- Track side ditching and brush cutting in upland areas is required from Stoughton Station to New Bedford and Fall River.
- Grade crossing drainage will be improved during the renovation and restoration of the highway grade crossings.
- The existing ballast is fouled with sand, silt and fines, and must be cleared. The ballast will either be undercut to remove the fines, returning the sieved clean ballast, or the ballast will be plowed out and all new ballast added. Regardless of which technique is utilized, at least 8 inches of clean ballast is required below the ties.



SINGLE TRACK



DOUBLE TRACK

0 7 Feet

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Figure 2.5-1

Typical Track Cross Sections

TE 05921 Graphics Figures 5021-CS3.dwg

- Ties will be completely replaced prior to the start of commuter rail service. At this time it is anticipated that the entire line will be outfitted with concrete ties, elastomeric pads and compression Pandrol fast clips. The existing jointed rail will be scrapped and replaced by 132-lb RE CWR. This will eliminate most if not all of the vibration and noise usually associated with jointed (bolted) rail assemblies. The renewal of the rail, ties and drainage through the grade crossings will enhance not only train performance, but will also greatly reduce auto and truck impact noise.
- A second passing track will be added in three locations to allow more efficient movement of trains. The existing railbed in each of these locations was originally constructed with two tracks, one of which was subsequently removed. A second track will be constructed within the existing railbed footprint in the following areas on the Stoughton line:
    - Brock Street to just north of Elm Street in Stoughton;
    - In the vicinity of the Bridge Street bridge in Raynham
    - South of East Brittania Street to just north of Winter Street in Taunton.
- The proposed infrastructure in the Weir Junction area in Taunton and south to New Bedford and Fall River, will support freight interchanges and "runarounds" on dedicated freight tracks and in some cases shared or mixed track operations. This includes an interchange track at Weir Junction along with freight set-off / run-around tracks located between Hart Street and Cotley Junction.

The track alignment will pass through two environmentally sensitive areas known as the Hockomock Swamp Area of Critical Environmental Concern in Easton and Raynham and Pine Swamp in Taunton. The following section describes the track alignment requirements and options to carefully construct the track infrastructure improvements without negatively impacting the sensitive wetlands through these two valuable resource areas.

Hockomock Swamp ACEC

An existing elevated dry embankment exists through the Hockomock Swamp. The existing width at the top of this embankment ranges from 28 to 50 feet. The slopes supporting this dry embankment are generally 2:1 (h: v) slopes. Wetlands and vernal pools have been identified along the bottom of the embankment slopes through this area, well beyond the limits any planned improvements. In order to construct the track through the Hockomock Swamp a total width of 32.17 feet is required for track, ballast, ties, drainage, signals and a maintenance road. A 10-ft. maintenance road is included in the 32.17 feet on the elevated existing embankment to allow MBTA maintenance equipment to access and maintain the infrastructure in this area, but is not required and could be eliminated to reduce intrusion. The infrastructure improvements will not infringe on the abutting wetlands. Small height retaining walls may be required at localized areas to retain a minimum 32.17-foot workspace on the existing dry embankment.

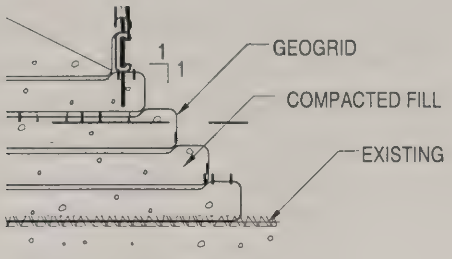
Pine Swamp

An existing dry portion of the right-of-way, which ranges between 19.5 feet to 24 feet, can be used for constructing the track improvements through Pine Swamp. Wetlands and rare species exist outside of these limits. The existing embankment through Pine Swamp must be raised approximately 1.3 feet, which includes the depth of ties, rail, and ballast. The structure supporting the embankment under the track must be designed for Cooper E80 train loading. Therefore, in order to construct the track infrastructure improvements without impacting the wetlands or rare species, three construction options have been considered.

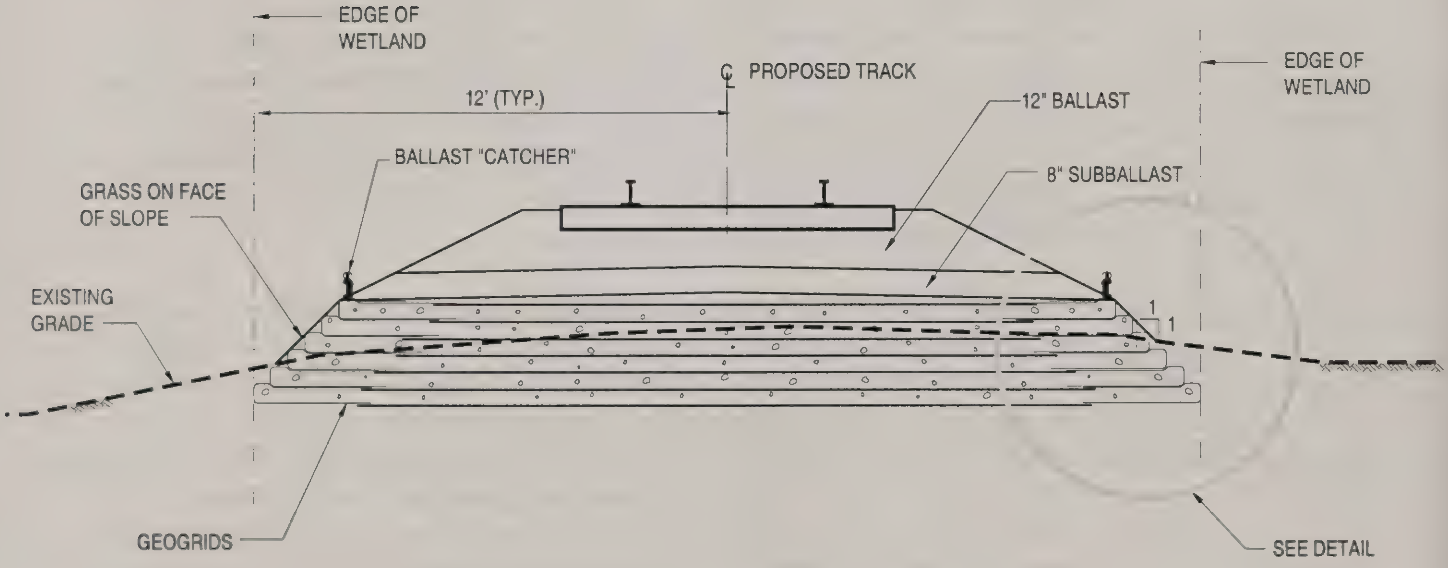
Option 1 – MSE Slope Retention System (See Figure 2.5-2). Option 1 consists of utilizing a mechanically stabilized earth (MSE) slope retention system to support the track and the required additional fill to raise the track to the proposed profile. This system consists of compacted fill reinforced with geogrids. By utilizing the geogrids under the track and at the face of the slope, a slope as steep as 1:1 can be achieved. Vegetation can be grown on the face of this slope which will minimize the environmental impacts by recreating the existing terrain. The geogrids and compacted fill material making up the reinforced earth will assist in stabilizing any soft soils that are revealed by soil borings, for the E80 loading. Dewatering is not required for this type of wall system. The entire width of 24 feet between the wetland limits will be affected during construction. This system would require further evaluation for vibration effects.

Option 2: - Reinforced Earth Wall System (See Figure 2.5-3): Option 2 consists of a reinforced earth wall system. This system consists of reinforced soil retained by precast concrete panels that are mechanically tied together. The limited height of the required panel sections, approximately four to six feet, allows for them to be placed directly on the ground; i.e. not on a footing. Pending the outcome of soil borings, the panel can be modified so it can be set on a bed of crushed stone, this easing construction and eliminating the need to dewater the area. This wall system can be constructed without impacting the wetlands. Footings, if required, can be precast. The wall panels are typically 5 ½ inches thick and 10 feet long. These panels can be easily placed using a crane, which can access the site from the top of the embankment on timber mats. The environmental impacts are minimal for this option. The final in place structure will be approximately 20 to 21 feet wide, which allows an additional buffer of 2 feet per side to the wetland limit.

Option 3: - Steel Sheeting with Concrete Cap (See Figure 2.4-4): Option 3 consists of steel sheeting with a concrete cap. The sheeting will be driven along both sides of the track to stabilize the track bed. Compacted fill will be placed between the sheeting to create the proposed track profile. Tie rods could be utilized with this system, if necessary. This option will require extensive driving of sheeting which means that a sizable crane will need to be mobilized in this sensitive area. A concrete cap will be cast in place on top of the sheeting. The final in place structure will be approximately 21 feet wide, which allows an additional buffer of 1.5 feet to the wetland limit.



MECHANICALLY STABILIZED REINFORCED
EARTH SLOPE RETENTION SYSTEM



0 2.5 5 Feet

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Pine Swamp Crossing
Option 1
Mechanically Stabilized Earth
Slope Retention System

Figure 2.5-2

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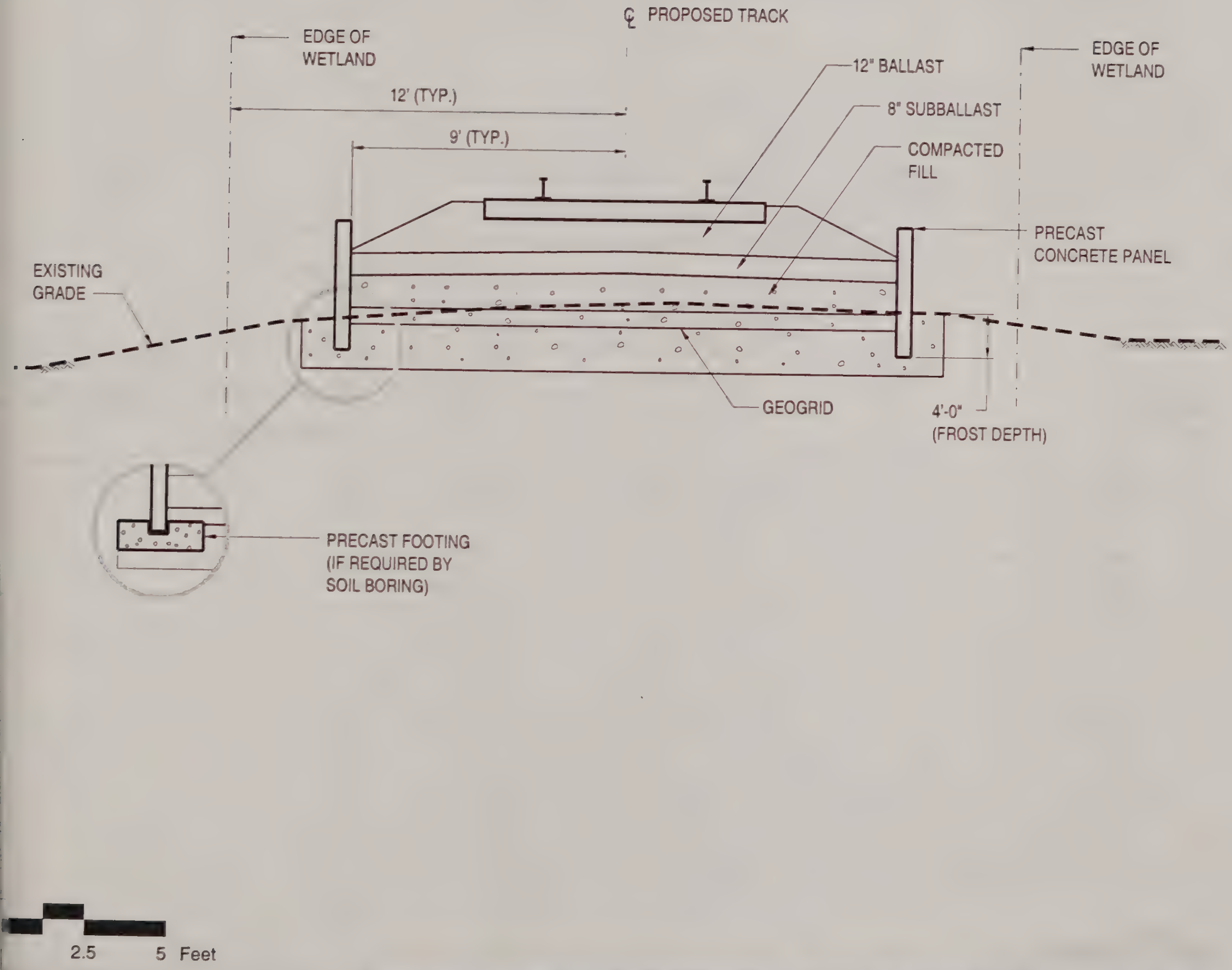

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Pine Swamp Crossing
Option 2
Reinforced Earth Wall System

Figure 2.5-3

Table 2.5-1
Inventory of Grade Crossings

No.	Town	Street Name	Milepost	Jurisdiction (Public/Private)	Recommended Treatment
1	**Stoughton** (6)	Brock Street	4.30	Public	Traffic Signal Pre-emption
2		Plain Street	4.60	Public	Traffic Signal Pre-emption
3		Morton Street	5.20	Public	Close Crossing
4		Pearson's Crossing	5.30	Private	Close Crossing
5		Private Drive	5.40	Private	Close Crossing
6		Stoughton Fish & Game Club	5.60	Private	Close Crossing
7	**Easton** (12)	Elm Street	7.60	Public	Std. Gates & Flashers
8		Oliver Street	7.80	Public	Std. Gates & Flashers
9		Williams Street	8.30	Public	Close Crossing
10		Easton DPW Crossing	8.65	Private	Close Crossing
11		Gary Lane (Easton Water Dept)	9.20	Private	Close Crossing
12		Short Street	9.55	Public	Std. Gates & Flashers
13		Depot Street (Route 123)	10.00	Public	Std. Gates & Flashers
14		Purchase Street	10.20	Public	Std. Gates & Flashers
15		Prospect Street	10.90	Public	Std. Gates & Flashers
16		Country Club Crossing	11.40	Private	Close Crossing
17		Foundry Street (Rt 106)	11.80	Public	Std. Gates & Flashers
18		Power Line Crossing	12.40	Private	Close Crossing
19	**Raynham** (6)	Raynham/Taunton Greyhound Park	13.90	Private	Std. Gates & Flashers
20		Elm Street	15.40	Public	Std. Gates & Flashers
21		Carver Street	15.80	Public	Std. Gates & Flashers
22		Britton Street	16.50	Public	Std. Gates & Flashers
23		King Phillip Street	17.10	Public	Std. Gates & Flashers
24		East Britannia Street	18.10	Public	Std. Gates & Flashers
25	**Taunton** (2)	Longmeadow Road/Winter Street	18.90	Public	Std. Gates & Flashers
26		Dean Street (Route 44)	19.40	Public	Std. Gates & Flashers
		Total Public Crossings		18	
		Total Private Crossings		8	
		Total Number of Crossings		**26**	

Need for Improvements

Based on the anticipated final service limits, all grade crossings on this line will need improvement. In order to maintain adequate train and highway safety, new grade crossing signals and gates will be installed at all locations. The existing grade crossing base material varies from timber and asphalt to fully rubberized grade crossing surface, and at some locations there are no rails at the grade crossings. Because the tracks and drainage through the grade crossing requires improvements, the highway approaches will also be upgraded at the same time.

The existing abandoned signal equipment has been gutted and vandalized and serves no useful purpose, and cannot be restored to workable condition and thereby must be replaced. Commuter rail trains require modern electronic signal controls in order to operate safely.

Proposed Work

Protecting every highway grade crossing with gates and flashers is recommend prior to the implementation of final service. All locations will be upgraded with gates and flashers and at locations warranted, sidewalk gates will also be added. New constant warning time grade crossing signal devices installed during this project. New signal houses with constant warning devices will be installed with track shunts located at full approach limits. Provisions for new sidewalk gates will be analyzed on a case by case basis and the grade crossing warning devices will be integrated into the highway signaling system as required. The tracks through the grade crossing will be upgraded to CWR, along with the installation of new ties, ballast, and asphalt.

Some of the existing at-grade crossings are recommended to be closed due to their configuration with respect to the railroad alignment. There are also recommendations at several locations for gate mechanisms or the installation of additional flashers is planned to provide warning for adjacent driveways or areas of impaired sight distance.

The existing highway grade crossing material will be replaced at all locations. New grade crossings will be designed and installed using a prefabricated grade crossing system, either of full depth rubber or precast concrete construction. All crossing locations will have drainage improvements and roadway approach improvements as required. Sight distances and approaches will be improved by clearing and trimming vegetation, adjusting the roadway profile, and the addition of advance pavement markings.

In order to provide sufficient sight distances to the warning devices at each location, it is recommended that vegetation at each crossing be cleared to open up the sight lines for both the train operator and motorist.

A number of at-grade crossing locations along the Stoughton Branch will require specialized treatment due to the proximity of the crossing in relation to the track or highway. The following paragraphs discuss these locations.

Stoughton Frontage Road

The MBTA proposes to close the Morton Street, Pearson's Crossing, Private Drive and the Fish & Game Club crossings because of the sight distance to view the railroad crossing is inadequate for vehicles approaching these crossings and the insufficient storage for vehicles turning from Washington Street (Route 138) onto the Morton, Pearrson, private drive and the Fish & Game Club crossings. Although traffic volumes at these locations are low, queues of more than two vehicles waiting to turn onto Route 138 will block the grade crossing. Therefore, it is recommended that these crossings be closed with permanent barricades and a fence and a frontage road be constructed to route traffic to the grade separated crossing at Totham Farm Road (See Figure 3.1.#). A total of 0.4 acres will be required for this frontage road from the private property owners located in this area (See Figure 2.5-5).

Route 138 Crossing

The Route 138 Crossing in Raynham requires grade separation due to the high traffic volume on Route 138 and severe skew angle of the crossing (see Figures 2.5-6 and 2.5-7).

Several alternatives were investigated and the most feasible option is to depress the railroad at Route 138 and build a highway bridge over the track (grade separate). Since the profile of the railroad cannot exceed a 3 percent slope and the topography is very flat in this area, retaining walls will be required for approximately 500 feet on either side of the underpass to depress the railroad into a cut section. These retaining walls will vary in height from two feet to 23 feet high.

The structure will be designed for a single-track system. The lateral clearance of 12 feet from track centerline to face of the cut section will result in an inside dimension of 24 feet clear. Due to the high skew of the railroad alignment crossing Route 138, an underpass approximately 245 feet long is required. The water table is high in this area since the depressed area is partially adjacent to a wetland area. The presence of the water table above the bottom of footing of this structure requires that this be designed as a boat section. The slab at the bottom of the boat section will need to extend into the approach sections to avoid local stormwater inflow. Pumps will need to be incorporated into the design to handle any water that does enter the structure.

The grade separation will allow the existing profile of Route 138 to remain similar to the existing grades, and will not require access modifications to the existing businesses in this area.. However, access to the Post Office building and the adjacent two-story building will be impacted during construction. Phased construction will reduce this time period. The electric sub-station and cell phone tower on the north side of Route 138 will need to be relocated. These structures are currently located within the right of way and are both only approximately 2 feet off of the proposed track alignment. Further north is a one-story building with fuel storage tanks that are located approximately 22 feet off of the proposed alignment, the building is approximately 25 feet off the alignment. It appears construction of the railroad and grade separator structure will not impact the tanks or building. A full geotechnical study will be performed to determine the water table elevation and top of ledge elevation prior to completion of the design, to ensure that these issues are meaningfully addressed. Existing public utilities in Route 138, including the North Raynham Water Company pipeline, will have to be relocated.

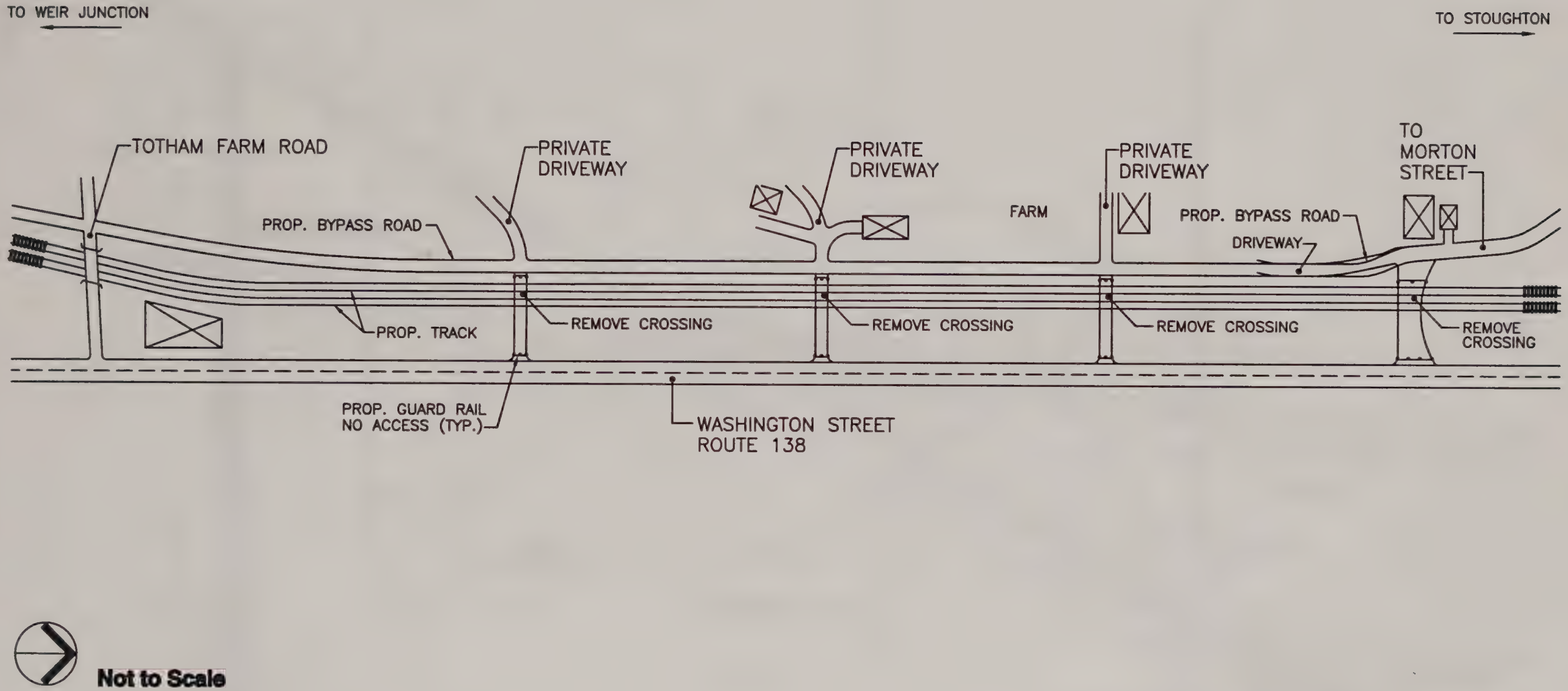

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Figure 2.5-5

Frontage Road

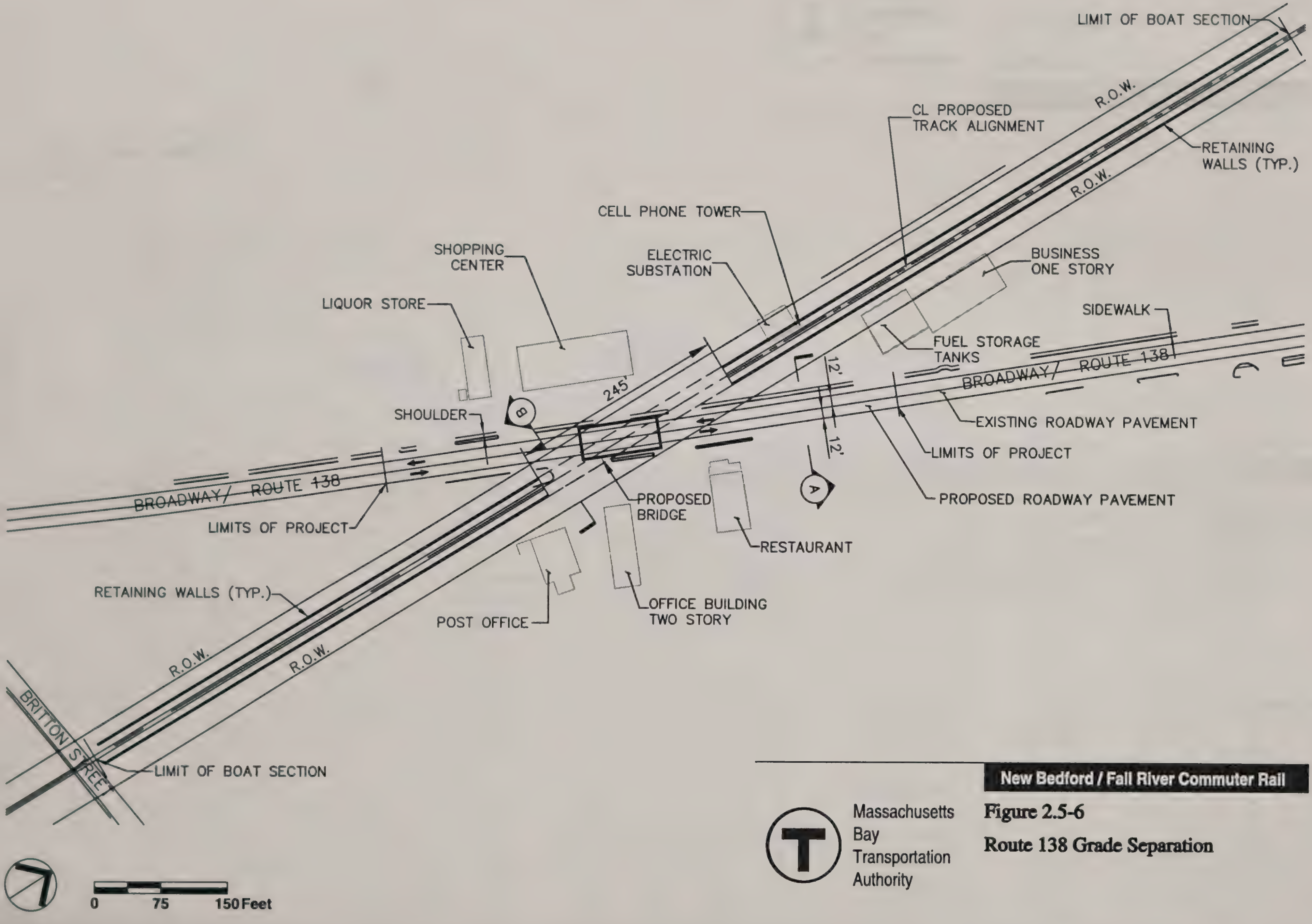

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Figure 2.5-6

Route 138 Grade Separation

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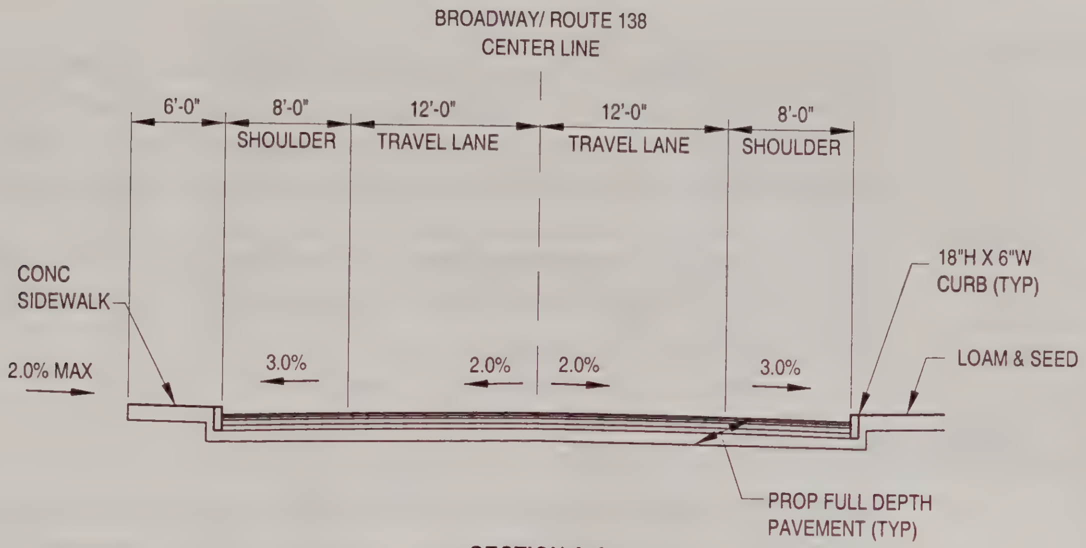
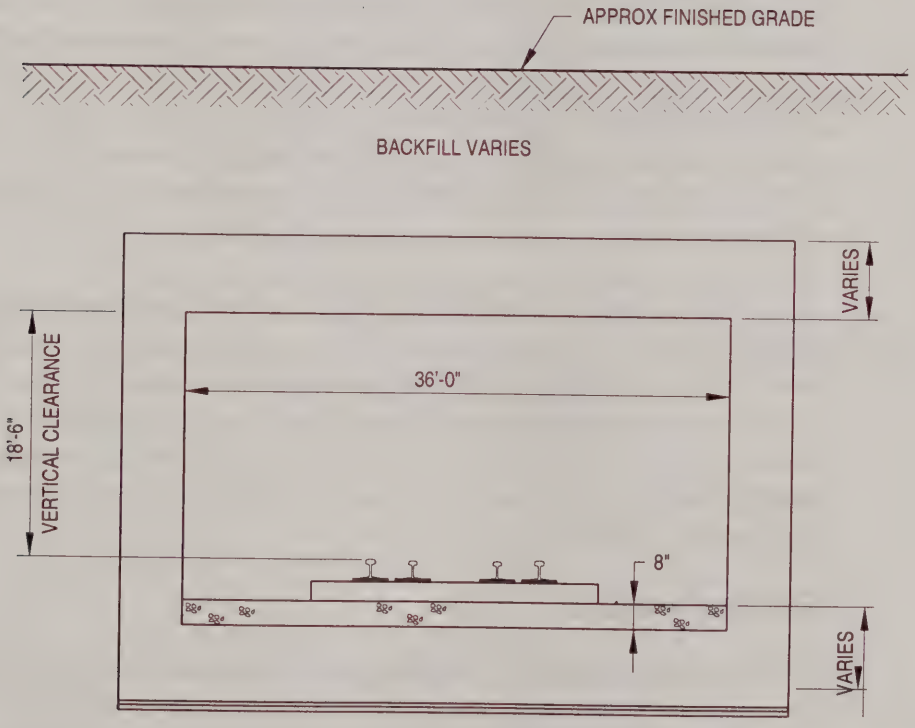


SECTION A-A
BROADWAY/ ROUTE 138

TYPICAL SECTION



SECTION B-B

TYPICAL TUNNEL SECTION

12.5 Feet

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Stoughton Branch
Route 138 Grade Separation
Typical Cross Sections

Figure 2.5-7

Staged construction will be required to construct this grade separated crossing at Route 138. All motor vehicle traffic and access to abutting properties will be maintained during all phases. A traffic management plan will be developed and implemented to deal with these issues including access to adjacent properties.

South of Route 138 the alignment crosses Britton Street. The existing profile of Britton Street will need to be lowered to accommodate the proposed railroad alignment and profile.

2.5.2.3 Bridge Improvements

None of the existing undergrade bridges on the Stoughton Branch (bridges which support track), are sufficient to properly support the design standards for Class 4 service. In order to accommodate the design requirements, the bridges will be rehabilitated or replaced. The repairs will consist of both substructure and superstructure repairs. The shorter span bridges will be precast, prestressed concrete bridge types and the longer span bridges will be steel bridge types. All bridges will be designed as ballasted deck bridges, which will generally cause far less vibration and noise impacts than an open deck bridge. Two bridges along the line are stone arch bridges, which are recommended to be rehabilitated. Approach slabs will also be incorporated at all bridge locations except the stone arch bridge type structures. Approach slabs are designed to absorb and mitigate the impacts of the approaching train, thereby reducing the induced vibration into the bride and lessening the overall noise generation.

This section describes the existing conditions of bridges along the Stoughton Line, discusses the need for improvements to those bridges and describes the work proposed to rehabilitate, repair, or replace those bridges. There are 10 undergrade bridges located within the project area, from Stoughton Station to Ingell Street in Taunton (Weir Junction). The end of the Stoughton Line then merges onto the New Bedford Secondary Line and continues south through Cotley Junction to New Bedford and Fall River.

Existing Conditions

The overall condition of the majority of the undergrade bridges on the Stoughton rail lines is poor. Many of the bridges were built between 1890 and 1907. All 10 undergrade bridges on this line must be rehabilitated or replaced to adequately support the Cooper E80 loading required for the proposed commuter rail service.

Need for Improvements

Based on the Undergrade Bridge Inspection and Rating Report dated October 1998, the bridges require replacement of the superstructure to meet the Cooper E80 loading criteria, the current standard for railroad bridges safety. In addition to low ratings, several bridges do not meet the current MBTA train clearance envelope.

The majority of the existing bridges are open timber decked, a construction technique that attaches the rails directly to the bridge timbers. As a train proceeds along the tracks, it progresses along a ballast track bed, but upon reaching an open decked bridge there is no ballast to cushion the train loads. This creates a hard spot causing impact vibration and noise, and adversely affecting ride quality. Although the designs met the clearance standards at the time of construction (in 1890 and 1907) the current MBTA clearance envelope is in conflict with the existing girder flanges and could also be in conflict with any planned repairs such as knee bracing or web stiffeners. In addition to lateral clearance, vertical clearance is substandard. The bridges at roadway crossings need to be rehabilitated to increase the roadway vertical clearance under the bridge to provide the 14.5 foot clearance requirement. Bridge wingwalls, retaining walls, and abutments that do not meet current AREMA or AASHTO criteria for factors of safety will be repaired or replaced.

Proposed Work

Nine of the ten bridges require significant repairs to the substructure, superstructure or both. While the line was out of service, the Totham Farm Road Bridge was completely removed, so it must be entirely replaced. The Coal Yard Road Bridge is proposed to be filled in for the future commuter rail service. The proposed modifications to the remaining eight bridges include rehabilitation by repair or replacement of specific structural elements and repair of the substructure. The structural repairs will also include the addition of approach slabs. Approach slabs are a technique to gradually alter the rail bed ballast resistance force and thereby lesson or eliminate the effects of impact vibration. Approach slabs will be required for all of the bridges along this branch. This will increase ride quality and decrease vibration and noise. During the final design phase, all walls or abutments in poor condition, showing signs of displacement, spalling, or cracking, will be evaluated for structural and geotechnical requirements. The recommendations for construction for each bridge are summarized in Table 2.5-2.

Table 2.5-2
Bridge Rehabilitation

Bridge Over	Town	Type	Year	Recommendation
Coal Yard Road	Stoughton	Deck Stringer		Fill In
Totham Farm Road	Stoughton	Removed		Replace superstructure and substructure
Day's Farm Road	Easton	Deck Stringer		Replace superstructure and rehab substructure
Cowessett Brook	Easton	Deck Stringer		Replace superstructure and rehab substructure
Ames Street	Easton	Through Girder		Replace superstructure and rehab substructure
Small Creek	Easton	Deck Stringer		Replace superstructure and rehab substructure
Taunton River (mp 19.50)	Taunton	Deck Girder	1907	Replace superstructure and substructure
Taunton River (mp 19.70)	Taunton	Deck Girder	1907	Replace superstructure and substructure
Taunton River (mp 19.80)	Taunton	Deck Stringer		Replace superstructure and substructure
Mill River	Taunton	Deck Girder		Replace superstructure and rehab substructure

At this time complete design concepts are not yet finalized, but it is anticipated that for shorter spans precast prestressed concrete bridge components will be used, and for longer spans steel bridges will be designed. For all bridge types, ballasted decks will be used. Generally, ballasted deck bridges cause far less vibration and noise. In extremely sensitive areas, vibration isolation mats of neoprene construction can be added to bridges to further lessen the vibration and associated noise. Other techniques under considerations are the use of lightweight fills behind retaining walls. Retaining wall and abutments will be upgraded for the AREMA loading criteria and repointed for structural and aesthetic purposes. The use of epoxy grout injection for wall repair is anticipated.

2.5.2.4 Railroad Signal Systems

The existing signal system from Canton Junction to Stoughton Station is approximately 25 years old and is nearing the end of its useful life. Due to the proposed operations, the existing system will require replacement.

Existing Conditions

From Stoughton Station south to Taunton (16 miles) there is no current signal equipment, because the track is out of service. From Taunton south to New Bedford and Fall River, there exists some minor equipment along the tracks, including old signal cases and signal houses, old abandoned central instrument locations (CILs) and old central instrument houses (CIHs).

Need for Improvement

None of the existing equipment is operable, and CSX presently operates with a manual system. The existing abandoned equipment has been gutted and vandalized, serves no useful purpose, and cannot be restored to workable condition and thereby must be replaced.

The new signal system for commuter rail service will be cab with wayside signal system. The signal design speed between Canton Junction and New Bedford and Fall River is 79 MPH , although the maximum intended speed for commuter rail will be 69 MPH. Freight operating speed between Myrick's Junction to New Bedford and Fall River will be 45 MPH. The design will be cab without wayside except at interlocking locations. Signal block lengths will average 5,200 feet. A coded DC track circuit will be used. Code change points have been incorporated into the design to facilitate the movement of trains, based on the needs of the block layout. Electric power switch machines and vital microprocessors will be used at all interlockings. Hand throw switch machines with electric locks will be installed for outlying siding tracks, used to clear the main line.

Two passing sidings will be located along the Stoughton Branch, one at the Raynham Station (between MP 14 and MP 15), and one located at Thrasher Street (between MP 18 and MP 19). Both will be equipped with #20 turnouts. The #20 turnouts for passing sidings will permit trains to continue along the siding (parallel or opposing) at 45 MPH while being overtaken and passed by a faster commuter train traveling at 69 MPH. These signal and track improvements will permit safe and efficient commuter operations.

2.5.3 Commuter Rail Service

The MBTA proposes to provide commuter rail service between Boston and the southeastern Massachusetts communities of New Bedford and Fall River, to reduce traffic congestion, reduce vehicle miles traveled, and encourage economic development of the southeastern Massachusetts region. Trains are planned to depart from Boston's South Station, with stops at Back Bay, Canton Junction, Stoughton, North Easton, Raynham, Taunton (Dean Street), East Taunton, Freetown, Battleship Cove (off-peak), Fall River and New Bedford. In addition, New Bedford and Fall

River trains will provide limited service to Route 128, Hyde Park and Ruggles Street commuter rail stations.

Commuter rail service to New Bedford and Fall River is anticipated to take 1 hour and 15 minutes. Commuter rail service to New Bedford and Fall River is comparable to automobile travel during off-peak times but commuter rail service would be considerably less than the peak-period auto travel times.

Commuter rail fares will be based on the MBTA's existing fare structure (Table 2.5-3).

Table 2.5-3
Commuter Rail Fares

Station	Zone	One-way Fare	Monthly Pass
North Easton	5	$3.25	$104
Raynham	6	$3.50	$112
Dean St. (Taunton) & East Taunton	7	$3.75	$120
Freetown	8	$4.00	$128
Fall River & New Bedford	9	$4.75	$136

The MBTA anticipates a maximum of 40 trains per day, 20 to each end point, with trains at approximately 30-minute intervals during the morning and evening peak commuter hours and at 2-hour intervals at off-peak times. Some weekend service will be provided, consistent with service on other MBTA commuter rail lines.

2.5.4 Commuter Rail Stations and Layover Facilities

Eight new commuter rail stations are proposed for the New Bedford/Fall River Commuter Rail Project using the Stoughton Alternative: North Easton, Raynham, Taunton (Dean Street), East Taunton, Freetown, Fall River, Battleship Cove (Fall River) and New Bedford. The East Taunton, Fall River, and New Bedford Stations were described in the ENF and are not discussed further in this DEIR. Each station will consist of a handicapped-accessible, 800-foot long, high- level platforms with a canopies to protect commuters from precipitation, a drop-off/pick up area, and general and handicap parking areas. Access and circulation at each station has been designed to avoid vehicle conflicts and congestion, and to promote local pedestrian and bicycle access. Although no connecting bus routes have currently been identified, stations have been designed to allow buses to enter and drop off or pick up passengers adjacent to the platform. The proposed East Taunton, Fall River, and New Bedford Stations and Layover Facilities were described in the ENF. There have been no changes to the location, design, or ambient environmental conditions subsequent to the publication of the ENF. This section therefore describes the new stations at North Easton, Raynham, and Taunton, as well as the relocated Freetown and Battleship Cove stations.

2.5.4.1 North Easton Station

The North Easton station will serve as an intermediate stop along the New Bedford/Fall River Line approximately three miles south of the existing Stoughton commuter rail station. The proposed 12.2-acre station site is located on the west side of Route 138 behind the existing Route 138 Motel between Union Street and the Stoughton/Easton Town Line. Figure 2.5-8 shows the general location of the proposed station site including nearby roadways and intersections. Adjacent land uses include the existing motel and several residential and small commercial uses along Route 138. This proposed station would primarily serve residents in the Town of Easton and south Stoughton. These travelers would access the site via local streets to Route 138.

The proposed North Easton station has been designed to serve the anticipated rail service with parking provided for 1,200 vehicles. Separate access will be provided for pick–up/drop–off activity. The pick–up/drop–off area has been designed to accommodate feeder bus service, although no such service is currently planned. A conceptual site plan for the proposed North Easton station is shown in Figure 2.5-9.

2.5.4.2 Raynham Station

The Raynham Station will also serve as an intermediate stop along the New Bedford/Fall River Line. It will be located approximately one and one–half miles south of Route 106 and two miles north of Interstate 495 on the west side of Route 138, behind the existing Raynham–Taunton Greyhound Park. The proposed 5.8-acre station site is an area on the northwestern portion of the dog track parcel that is currently used to stockpile utility poles. Figure 2.5-10 shows the general location of the proposed station site including nearby roadways and intersections. Adjacent land uses include the dog track and a number of other industrial uses that lease space on the dog track parcel, including a trucking company and a construction company. This station would primarily serve residents in Taunton, Easton, and Raynham, who would access the site via Route 138. Regional access to the site is also possible via I-495, which intersects Route 138 just south of the greyhound park.

The proposed Raynham Station has been designed to serve area comuter rail service demands with parking provided for 450 vehicles. Similar to the proposed North Easton Station, separate access will be provided for pick–up/drop–off activity (which has also been designed to accommodate potential future feeder bus service). A conceptual site plan for the proposed Raynham Station is shown in Figure 2.5-11.

2.5.4.3 Taunton Station

The proposed Dean Street Station would serve City of Taunton residents. The proposed 8 acre station site is to be located off of Railroad Avenue near the intersection of Route 44 (Dean Street) and Arlington Street in Taunton. Figure 2.5-12 shows the general location of the proposed station site including adjacent roadways and nearby intersections. Adjacent land uses near the site are primarily industrial, but the area is also surrounded by a substantial residential neighborhood. Access to the site would be provided primarily via Route 44. The site can also be accessed via a number of local streets.

The proposed Dean Street Station has been designed to accommodate pick–up/drop–off activity and parking for 500 vehicles. A conceptual site plan for the station is shown in Figure 2.5-13.

2.5.4.4 Freetown Station

The Freetown Commuter Rail Station will occupy approximately 6 acres of land off Ridge Hill Road (south of High Street), at a former gravel pit. Access to the station will be from Route 79 (South Main Street) via Ridge Hill Road. This lot will provide approximately 450 parking spaces, and is anticipated to serve as a major regional access point to the commuter rail system from Routes 79 and 24.

2.5.4.5 Battleship Cove Station

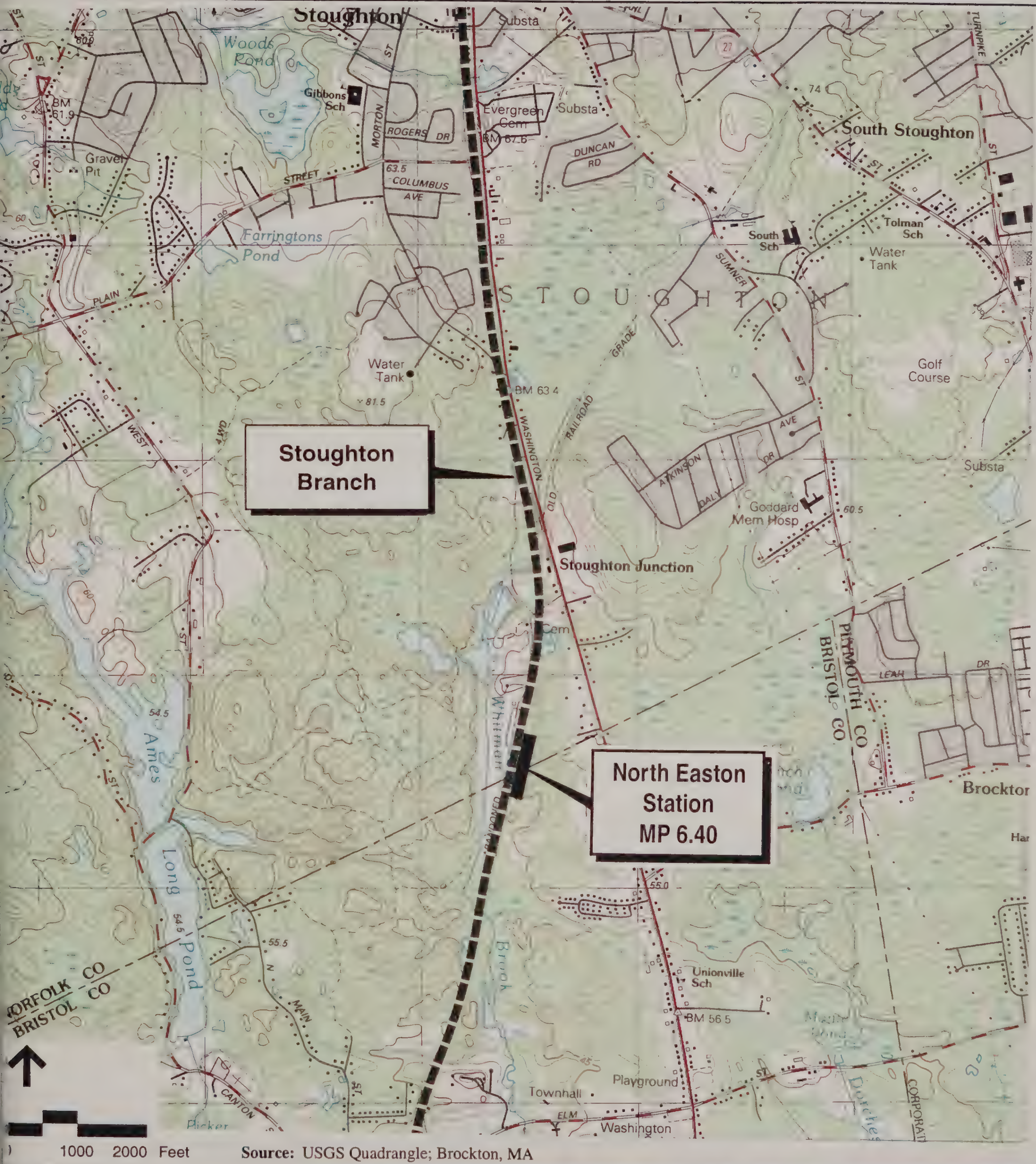
A second Fall River station, for pedestrian access only, is proposed at Battleship Cove adjacent to Water Street. A platform would be constructed, with a turn-around for pick-up/drop-offs and parking for 6 vehicles.

2.5.4.5 Stations Reviewed In ENF

The ENF described the commuter rail stations and layover facilities proposed for the Attleboro Alternative. Three of these stations (East Taunton, Fall River, and New Bedford) and the layover facilities at Fall River and New Bedford would also be part of the Stoughton Alternative, and are briefly described here.

East Taunton

The East Taunton station site will serve as an intermediate station stop for the proposed commuter rail line. The site is located off of Route 140 (County Street) in Taunton on Erika Road. The station site is located in the northwest corner of the proposed Taunton Depot retail development. Regional access to the site is provided by Route 24, which runs northeast from Newport, Rhode Island and Fall River,



Source: USGS Quadrangle; Brockton, MA

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North Easton Station
Site Location Map

Figure 2.5-8

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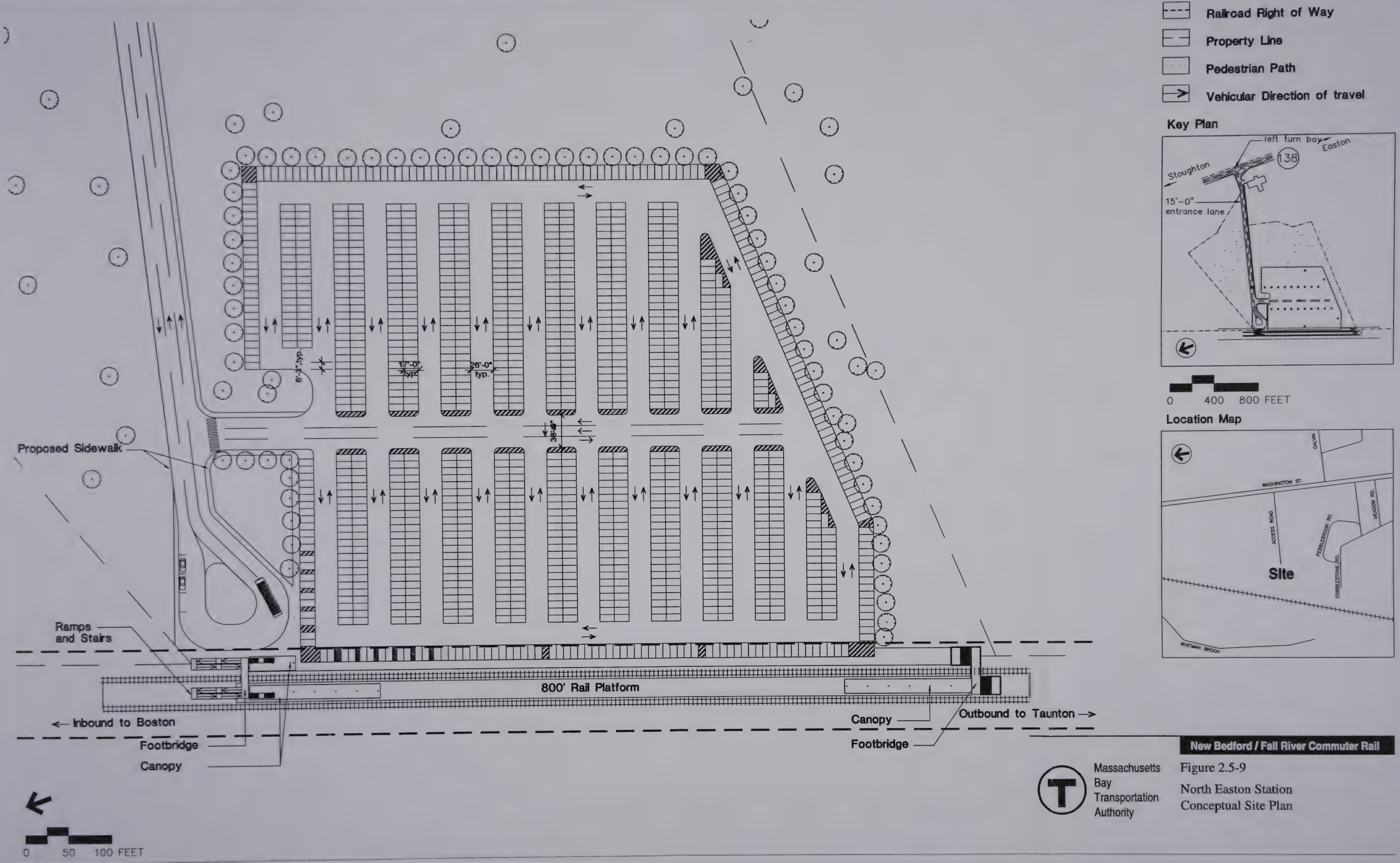

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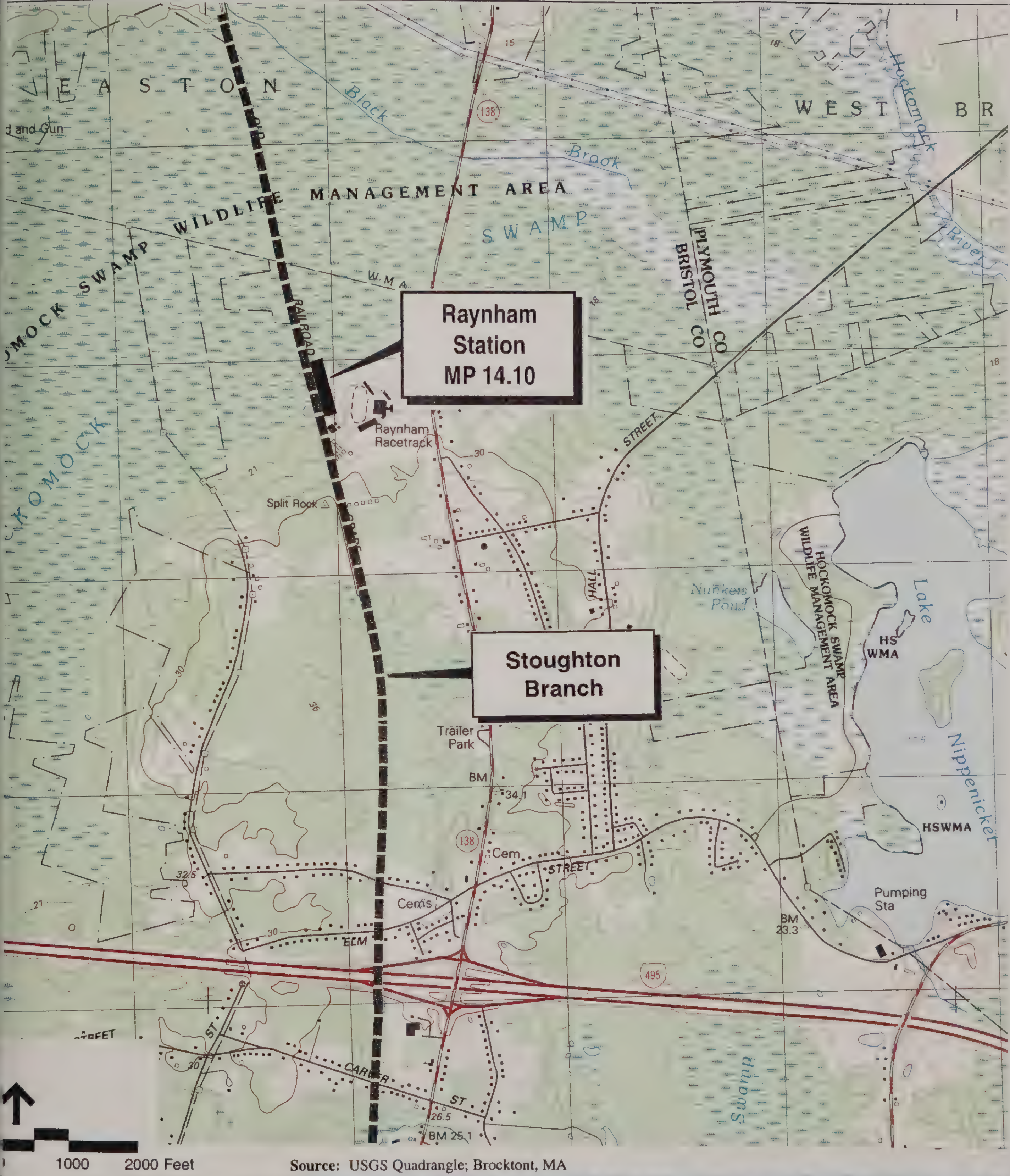
Figure 2.5-9

North Easton Station
Conceptual Site Plan



Source: USGS Quadrangle; Brocktont, MA

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Raynham Station
Site Location Map

Figure 2.5-10

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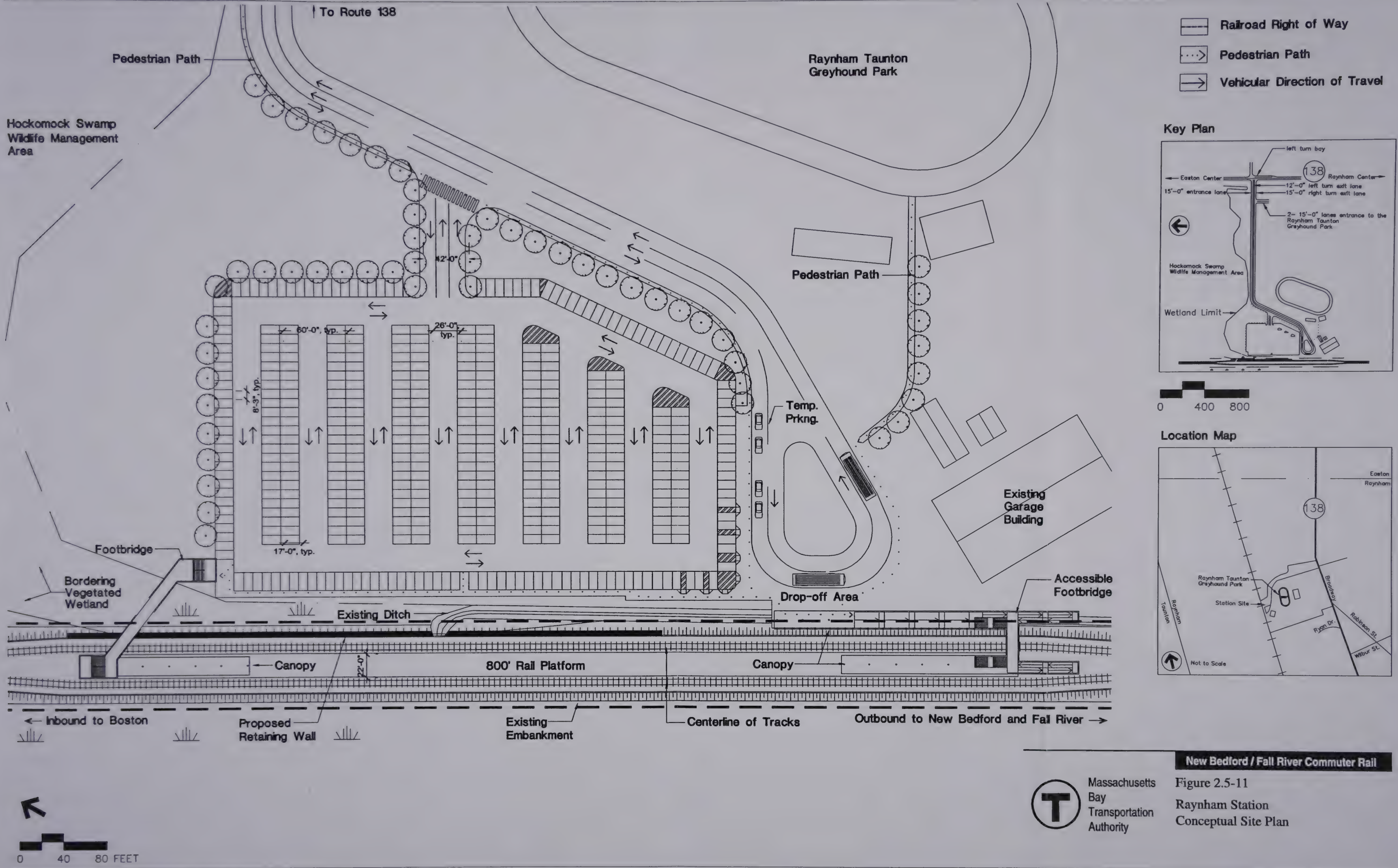

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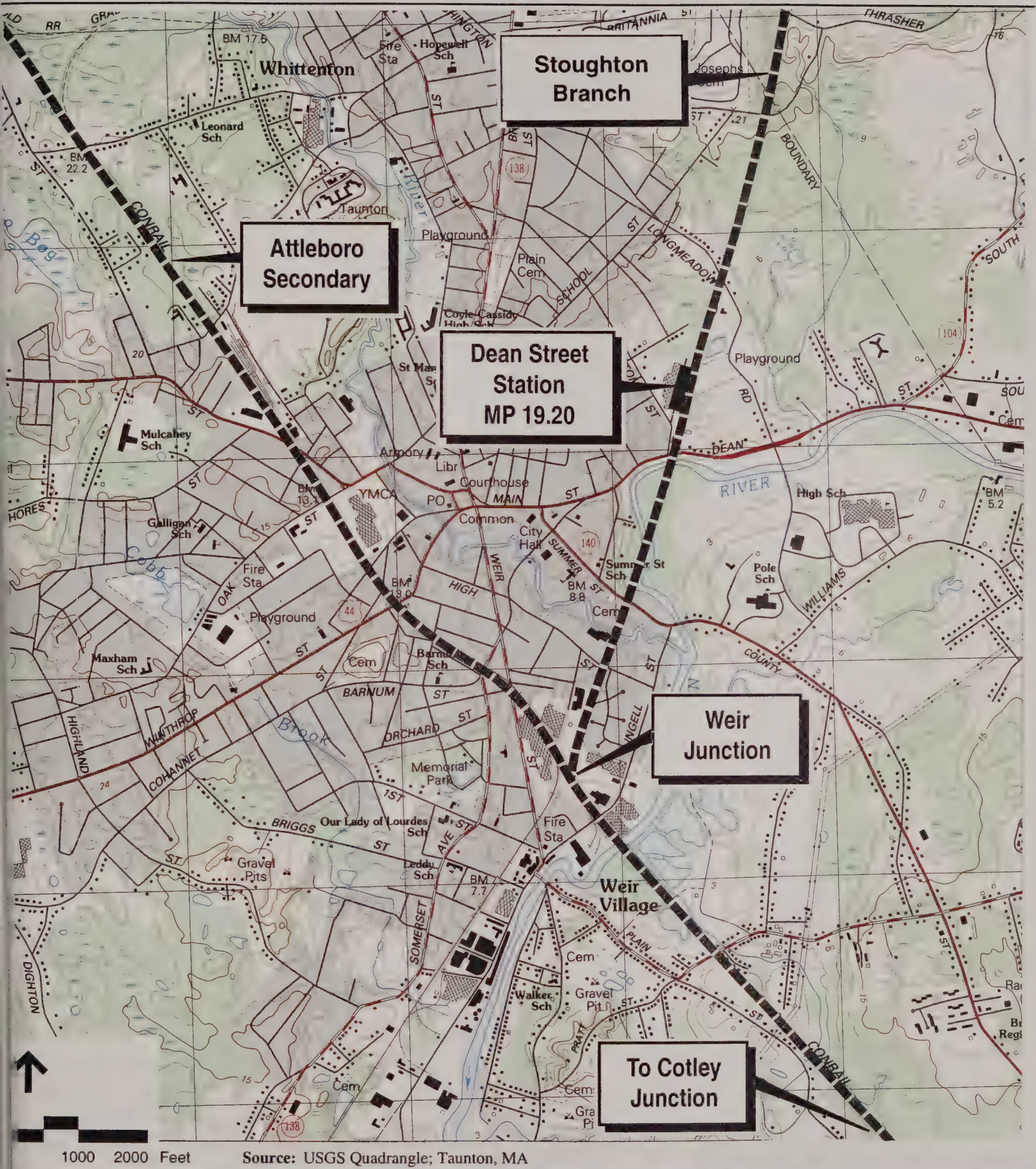
Figure 2.5-11

Raynham Station
Conceptual Site Plan



Source: USGS Quadrangle; Taunton, MA

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Taunton (Dean St) Station
Site Location Map

Figure 2.5-12

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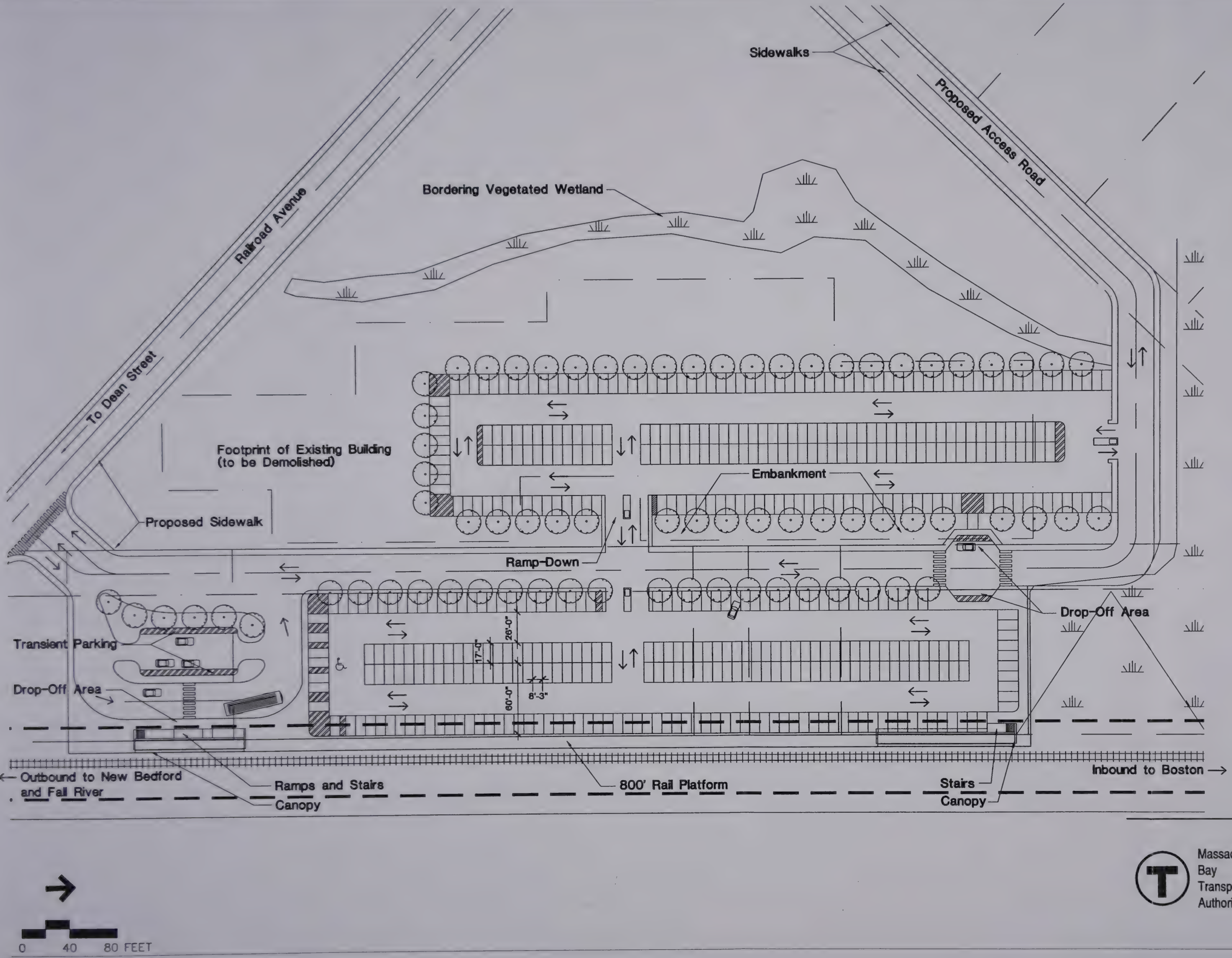
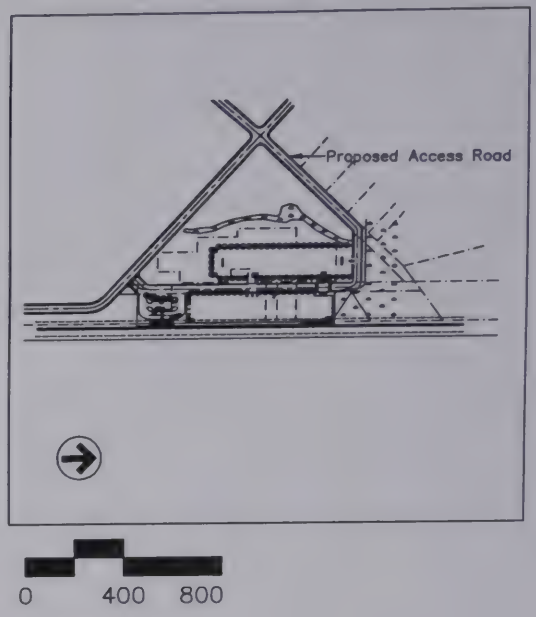


Railroad Right of Way

Property Line

Vehicular Direction of Travel

Key Plan



Location Map

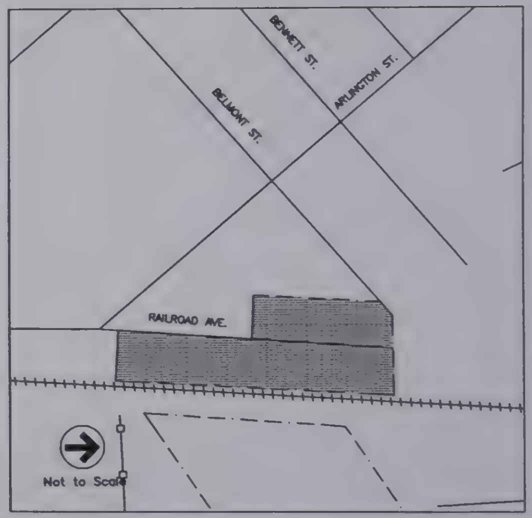


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Figure 2.5-13

Dean Street Station
Conceptual Site Plan

Massachusetts to Randolph, Massachusetts where it terminates at Interstate 93 (Route 128), and Route 140, which runs northwest from New Bedford to Taunton, Norton and several other towns to the northwest. Regional access is also provided by Hart Street which serves the Berkley to the west and Lakeville to the east.

The East Taunton station is expected to be the one of the most highly utilized station on the proposed commuter rail line due to its location at the intersection of two major regional highways. Therefore, the station has been designed to serve the proposed rail service with parking provided for approximately 950 vehicles. In addition, a separate access is provided for pick-up/drop-off activity. The station has been also been designed to accommodate feeder bus service, although none is currently planned.

Fall River

The proposed Fall River Commuter Rail Station would be located on an approximately 3-acre site at the intersection of Pearce Street and North Davol Street. Access to the site is from North Davol Street, with pedestrian access from Pearce Street. The site comprises four separate parcels, one of which is owned by the City of Fall River. Historically, the northern portion of the site was a foundry, and the Old Colony Depot was located on the site adjacent to the tracks. More recently, the property was occupied by a steel company. The site is currently vacant, and contains two unoccupied buildings. There are no wetlands or areas of natural vegetation on the site.

The site is located between Davol Street, Pearce Street, Braylies Street and the existing railroad line. Regional access to the station is provided by Interstate 195 which runs in an east-west direction just south of the study area, Routes 24 and 79 which provide access from the north, Route 6 which provides access from the east and west, and Route 138 which provide access from the west and the south.

The station has been designed to serve the proposed rail service with parking provided for approximately 500 vehicles in a decked parking structure. In addition, a separate access has been provided for pickup/drop-off activity. The station has also been designed to accommodate bus service into the site, although none is currently planned.

The Fall River Layover facility was proposed to be constructed along the existing Fall River Secondary south of I-195, between Route 138 on the west and Water Street on the east. The Layover Facility will be primarily north of Ferry Street, but will extend southward under the Water Street/Ferry Street bridge.

The facility would include four 800-ft long layover tracks, with a service road provided along the west edge of the facility and between the 2nd and 3rd tracks. A parking lot to accomodate 30 vehicles will be constructed off of Water Street. The facility will also include a small maintenance builidng and power unit substation at the north end of the layover tracks. The MBTA is currently evaluating alternative sites in Freetown for this facility.

New Bedford

The New Bedford Station is proposed to be located on a large parcel of vacant land on Herman Melville Boulevard, east of Route 18 and south of Wamsutta Street. This parcel was formerly occupied by a rail yard and railroad maintenance facility, and by the former Old Colony Depot. No structures associated with railroad activities currently exist on the site, although the foundation of the turntable is still visible. Access to the site is provided off of Herman Melville Boulevard, which provides good regional connections to Route 18 and to Interstate 195, located 1/2 mile north of the site.

The New Bedford station site will serve as a final station stop for this branch of the proposed commuter rail line and will also accommodate a layover facility. The site is located on Herman Melville Boulevard between the existing railroad line and Wamsutta Street. Historically, the site has been used primarily for industrial and railroad purposes. Regional access to the site is provided by Interstate 195, Route 6, Route 18 (the Downtown Connector) and several local roadways.

The proposed New Bedford station has been designed to serve the anticipated rail service with parking provided for approximately 950 vehicles. A separate access is provided for pickup/drop-off activity. The station has also been designed to accommodate feeder bus service, although none is currently planned. Pedestrian access to the site from the residential neighborhoods on the western side of the Downtown Connector will be provided by reconstructing the existing pedestrian overpass. In the proposed station design, the pedestrian overpass will be continued over the railroad line and end at the station platform.

2.6 Infrastructure Improvements – Fall River and New Bedford Lines

This section provides information on modifications to the infrastructure improvements proposed along the Fall River Branch and New Bedford Line, which would be necessary regardless of the alternative selected for service north of Cotley Junction.

2.6.1 Fall River Secondary

The Fall River Secondary is owned and operated by CSX. This line was constructed for, and contains, a single track. This segment is infrequently used by freight (service twice a week) and is not currently maintained in good condition. It is currently maintained to Class 1 requirements suitable for 10 MPH freight and 15 MPH passenger rail. Due to its condition, this segment of the track requires complete replacement of the ballast, ties and track in order to achieve the required Class 4 standards. To facilitate passenger operations, the MBTA proposes to construct a passing siding along the west side of the Fall River Secondary in Fall River.

2.6.2 New Bedford Main Line

The New Bedford Main Line south of Cotley Junction is owned and operated by CSX and was originally constructed for two tracks. Although only one track remains, the railbed is sufficiently wide to support a second track. This segment is infrequently used by freight (service three times a week) and is not currently maintained in good condition. It is currently rated as Class 1 (suitable for 10 MPH Freight and 15 MPH Passenger). Due to its condition, this segment of the track requires complete replacement of the ballast, ties and rail in order to achieve the required Class 4 standards. To facilitate passenger operations, the MBTA proposes to reconstruct the original second track throughout the length of the New Bedford Main Line.

2.7 Land Acquisition

Land acquisition will be required for construction of the Stoughton Alternative, in addition to the land acquisition described in the ENF. The right-of-way from Stoughton Station south to Route 138 in Raynham is owned by the MBTA (See Figure 1.4-2). The former right-of-way, south of Route 138 to Dean Street in Taunton (north of Weir Junction) is owned by 17 individual private property owners. The right-of-way from Weir Junction to Cotley Junction is owned by the Executive Office of Transportation and Construction (EOTC). The New Bedford Main Line and the Fall River Secondary are owned by CSX (formerly Conrail). The MBTA will require that the 17 properties between Route 138 and Dean Street be acquired to reinstate commuter rail along the Stoughton Alignment. The MBTA is currently in negotiations with CSX to purchase the right-of-way or obtain a long-term operating agreement for commuter rail service. Land acquisition will also be required at the North Easton, Raynham, Taunton, and Freetown stations. Construction of the Stoughton Alternative will require a total land acquisition of 72.9 acres. This is greater than the land acquisition required for the Attleboro Alternative (58.4 acres) due to the longer track segment not currently owned by EOTC, and the 2 additional stations.

3

Alternatives

This chapter provides a detailed comparative analysis of all alternatives considered to provide enhanced transportation benefits to the southern Massachusetts region, including the communities of Taunton, Fall River, and New Bedford.

3.1 Introduction

The 1995 ENF evaluated in detail four transportation alternatives: The Attleboro Alternative, the Stoughton Alternative, the Middleborough Alternative and the Bus Alternative (See Figure 3.1-1). The ENF identified the Attleboro Alternative as the preferred alternative because the existing track was in place, with the exception of the Attleboro Bypass. It was also considered a more environmentally permittable project because of this existing track. The 1995 Secretary's Certificate on the ENF directed the MBTA to evaluate the Middleborough and Stoughton Alternatives due to the substantial concerns raised by community groups and regulatory agencies with respect to the magnitude of environmental and social impacts associated with the Attleboro Alternative.

Subsequently, in 1996, the Massachusetts State Legislature directed the MBTA to evaluate all viable transportation alternatives for transporting commuters from South Station to the end terminus of New Bedford and Fall River. The MBTA prepared the *Expanded Alternatives Analysis Report* dated March 1997 that identified the Stoughton Alternative as a viable transportation option because it would be the most cost-effective alternative, with the highest ridership, and with fewer direct wetland impacts than the Attleboro Alternative. The Middleborough Alternative was determined not to be feasible due to operational constraints on the Old Colony Main Line north of Braintree, and due to the low projected ridership.

This chapter summarizes the four transportation alternatives and presents the rationale for the selection of the Stoughton Branch as the MBTA's preferred transportation alternative. The Stoughton Branch Alternative begins at Brock Street in Stoughton (south of Stoughton Station) and continues to Ingell Street (Weir Junction) in Taunton. South of Weir Junction, both the Stoughton and Attleboro Alternatives would use the same existing track system and would be identical with respect to impacts. This segment of the project was fully analyzed in the ENF. The segment of the project south of Cotley Junction in Taunton is common to all 3 of the rail alternatives, and was also fully analyzed in the ENF.

3.1.1 Project History

The MBTA has conducted several feasibility studies to determine if the extension of commuter rail service to New Bedford and Fall River is feasible, and to determine which of the alternative routes or modes would be feasible from a new transit ridership capture, cost and operations perspective, and would serve the largest number of commuters.

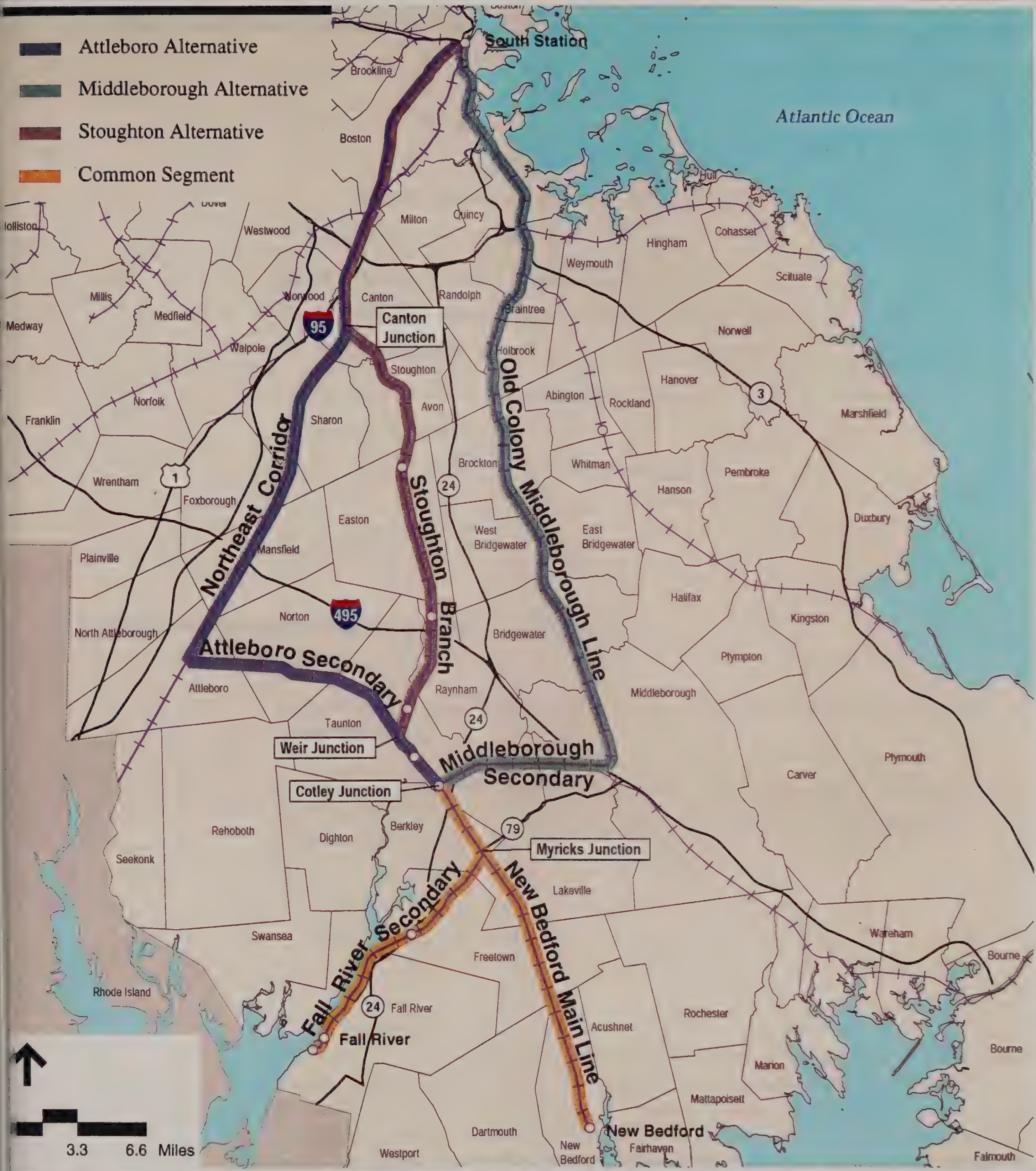
The MBTA conducted an initial feasibility study in 1990. This study recommended that service be extended from Canton Junction along the Stoughton Branch to New Bedford and Fall River. Five alternatives, in addition to an express bus service, were analyzed. In response to comments on the 1990 feasibility study by the Joint Transportation Planning Group of the Southeastern Massachusetts Municipal Planning Organization, the MBTA revised and expanded the feasibility study.

In May 1995, the MBTA released a *New Bedford/Fall River Expanded Feasibility Study*. This study identified the Attleboro Alternative as the MBTA's preferred alternative. The Expanded Environmental Notification Form (ENF) was submitted to the Executive Office of Environmental Affairs in September 1995. This ENF provided a detailed evaluation of the infrastructure improvements, commuter rail stations, and operations of the New Bedford/Fall River Commuter Rail system. The ENF also provided a summary of the alternatives analyzed in the MBTA's 1990 and 1995 feasibility reports, and identified the Attleboro Alternative as the MBTA's preferred alternative.

Due to public comments received during the ENF response period, in August 1996 the Massachusetts State Legislature adopted the 1996 Transportation Bond Bill (Chapter 205, Section 2J) and directed the MBTA to further study all viable alternatives for extending commuter rail service to both New Bedford and Fall River. The *Expanded Alternatives Analysis* (see Appendix) was completed in March 1997, and provided a comparison of all alternatives based on ridership, cost, and operational logistics. This analysis concluded that the Attleboro and Stoughton routes were the only options that would attract ridership levels comparable to those found on existing MBTA commuter rail lines.

3.1.2 Alternatives Considered

The 1997 *Expanded Alternatives Analysis* evaluated 4 primary alternatives. Each of these alternatives included variations with respect to service, operations, and equipment. These alternatives are listed below and described in detail in the following section.



New Bedford / Fall River Commuter Rail

Alternatives

Figure 3.1-1

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- Attleboro Alternatives
    - Standard Train Consists, Alternating Service
    - Diesel Multiple Unit Service
- Middleborough Alternatives
    - Standard Consists, Alternating Service
    - Skip-Stop Service/Cross-Platform Transfer at East Taunton
    - Relocated Middleborough/Lakeville Station (Alternating Service)
    - Relocated Middleborough/Lakeville Station (East Taunton Transfer)
- Stoughton Alternatives
    - Standard Consists, Alternating Service
    - Diesel Multiple Unit Service
- Enhanced Commuter Bus Service

3.2 Project Purpose

Each of these alternatives was analyzed with respect to the project purpose, as well as cost-effectiveness.

The extension of commuter rail service to the southeastern Massachusetts cities of Fall River and New Bedford is necessary to accommodate several important public interests within southeastern Massachusetts and Boston, which include:

- Reduction of traffic congestion
- Improved employment and tourist access
- Improved regional air quality
- Improved regional transportation capacity

The New Bedford/Fall River Commuter Rail project, using the Stoughton Alternative, would also provide rail service in Raynham and Easton as well as the communities of Taunton, Freetown, Fall River, and New Bedford, and will allow commuters from the towns of Swansea, Westport, Dartmouth, Fairhaven, Mattapoisett, Acushnet, and Lakeville to access commuter rail via stations in adjacent communities.. For this region, existing highway and transit facilities do not meet the existing or future needs for access between Boston and the study area communities.

3.2.1 Reduction of Traffic Congestion

Access from the study area communities to Boston is primarily via Routes 24 and 140 to I-93. These principal, limited-access highways currently operate at/over capacity, with peak-hour volumes of up to 2,640 vehicles per hour and level of service (LOS) of F on Route 24 in Randolph and 3438 vehicles per hour and LOS F on I-93 in Braintree. Routes 24 and I-93 currently operate at over capacity levels. Although several mitigation measures have been implemented on I-93 to reduce congestion (high-occupancy vehicle lanes, improved MBTA Red Line service, Old Colony Rail service), this roadway continues to operate at unacceptable levels of service, resulting in substantial congestion and decreased safety.

Congestion on these primary roads also affects travel time. During peak hours (6 to 10 AM and 3 to 7 PM), trip times increase by a minimum of 15 to 20 minutes. This results in loss of productivity, increased transportation costs, and affects the quality of life of commuters. The New Bedford/Fall River Commuter Rail service (Stoughton Alternative) would provide an approximately 50-mile trip with a travel time of 1 hour 20 minutes to South Station.

The New Bedford/Fall River Commuter Rail service (Stoughton Alternative) is projected to reduce vehicles using Route 24 and I-93 by over 4,000 vehicles per day during both the inbound (AM) and outbound (PM) commute. This will contribute to the reduction of traffic congestion on these key routes.

3.2.2 Improved Employment Access and Economic Benefits

The City of Boston continues to provide substantial employment opportunities at all levels, and also contains a substantial employment labor force. Access between study area communities and downtown Boston is constrained by the limited, overtaxed highway system and lack of alternative transit modes. Parking in Boston is also severely constrained by the limited space available for new parking, high demand for existing parking spaces that has resulted from new residential development, and the high cost of parking. These factors also present a very serious constraint on further automobiles commuting into Boston.

Several study area communities, particularly in the northern towns of Easton, Raynham and Taunton, have a substantial work orientation to Boston. Residents of these communities would benefit substantially from improved employment access and reduced cost of commuting and parking.

New Bedford and Fall River currently have higher unemployment rates than the state average. The New Bedford metropolitan area has been one of the slower growing regions in employment, and in May, 1999 had an unemployment rate of 5.2 percent, while the Providence-Fall River-Warwick area had an unemployment rate of 3.4 percent. Both were higher than the state average of 2.9 percent[1]. Improved access to employment markets in Boston would be likely to provide employment opportunities for the New Bedford and Fall River labor force that would provide substantial economic benefits for these communities. Commuter rail service would also allow "reverse commutes" from area communities such as Taunton to New Bedford and Fall River. New employers in New Bedford, such as the Compass Bank headquarters, would be able to draw on a larger labor pool within the southeastern Massachusetts region.

The introduction of commuter rail into previously unserved areas typically has a significant positive impact on residential property values. Increased property values would benefit New Bedford, Fall River, and other study area communities by increasing tax revenues and promoting urban revitalization.

3.2.3 Improved Regional Air Quality

The study area is located within an area designated nonattainment for ozone by the US Environmental Protection Agency (EPA), with a classification of "serious". Motor vehicles are the predominant sources of ozone precursor emissions within the study area. A shift in travel mode from automobiles to rail is expected to result in an overall reduction in vehicle emissions of volatile organic compounds and carbon monoxide, and would improve regional air quality.

3.2.4 Improved Regional Transportation Capacity

Areas east of this study area are served by the Middleborough Branch of the Old Colony Line, with stations in Lakeville and Bridgewater, while communities to the west are served by the Shore Line, with stations in Attleboro, Mansfield and Sharon. The major population centers of the study area communities are as much as 25 miles from existing commuter rail stations, with access over local secondary roads. Parking lots at existing stations are regularly filled to capacity on weekdays prior to 7 AM. The increased commuter distance and uncertainty of parking availability results in few study-area commuters being able to access transit services. There are no light rail or other transportation options within the study area.

Private express bus service provides commuter service to South Station in Boston during commuter hours and contribute to the area's transit options, but are subject to severe congestion on the highway system and require transit riders to transfer to the MBTA light rail system to access most employment destinations in Boston, increasing travel time. For these reasons, bus service provides an acceptable transportation mode to relatively few commuters. The New Bedford/Fall River Commuter Rail service would provide direct transit connections to the Back Bay Station as well as South Station, eliminating the need for commuters to make intermodal transfers and reducing commuting time and cost.

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[1] RKG Associates, 1997. Task 2 Research Findings: Existing Conditions Analysis, New Bedford Harbor Today. Prepared for the New Bedford and Fairhaven Harbor Master Plan Committee.

Poor or limited transportation opportunities also constrain access by study area residents to other important Boston destinations, which include education opportunities, with numerous private and public colleges and universities, the highest concentration of medical facilities and specialties in the Commonwealth, cultural facilities, and sports. Existing highway congestion, extended travel times, and limited/expensive parking affect the ability of area residents to access these other destinations. Access to educational opportunities in the southeastern Massachusetts region is also limited by the lack of public transportation between Boston and the region (reverse commuting). The University of Massachusetts at Dartmouth has recently established a new campus for the visual and performing arts in the New Bedford Harbor area. Improved transportation connections to this campus center would also benefit students.

The New Bedford –Fairhaven Harbor Master Plan[2] provides a comprehensive plan for redevelopment and revitalization of the harbor area, which has recently been designated as the New Bedford Whaling National Historic Park. Attractions, which include DEM's Schooner *Ernestina*, the proposed New Bedford aquarium, festivals, tours, and a new waterfront visitor destination at the State Pier, are estimated to attract an additional 120,000 visitors a year and generate $4 Million in gross revenues. The annual waterfront Summerfest currently attracts 100,000 people[3]. Improved transportation access via commuter rail would increase attendance at the Harbor's proposed tourism attractions, while alleviating some of the parking requirements for these attractions[4].

The Master Plan supports the development of a major intermodal transportation center providing commuter rail, freight, bus, and waterfront trolley connections with links to the water terminal for ferry and water taxi services. This intermodal terminal would be located in the North Terminal/Mills Area, some of the most underutilized land and water resources in the harbor, and adjacent to a proposed multimodal port terminal on approximately 30 acres of land to be created by the harbor cleanup dredging.

3.3 Alternatives Considered

This section provides a description of the physical features and operational characteristics of each of the alternatives considered.

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[2] New Bedford/Fairhaven Harbor Master Plan. Prepared by the City of New Bedford and Town of Fairhaven Harbor Master Plan Committee, 1999.

[3] FXM associates, New Bedford/Fairhaven Harbor Master Plan. Technical Memorandum: Expanded Economic Analysis. 1999.

[4] RKG Associates, 1997. Task 2 Research Findings: Existing Conditions Analysis. New Bedford Harbor Today.

3.3.1 Attleboro Alternatives

The Attleboro Alternative would utilize the existing Northeast Corridor (Amtrak's Shore Line) from Boston's South Station to Attleboro, where trains will proceed east to Taunton along the Attleboro Secondary. From Cotley Junction in Taunton, trains will proceed south on the New Bedford Main Line. Trains to Fall River will diverge at Myricks Junction in Lakeville along the Fall River Secondary. Construction of the Attleboro Alternative would require construction of 2 new bypass tracks diverging from the Northeast Corridor (Shore Line) using a high-speed turnout, approximately 2.5 miles north of the Attleboro Station, connecting to the Attleboro Secondary. This Attleboro Bypass would be a two-track bypass, which is critical to ensure that commuter rail trains can enter and exist the Northeast Corridor at 45 MPH, so Amtrak High Speed Rail service will not be interrupted.

With the exception of the Attleboro Bypass, the Attleboro Alternative will utilize existing active freight track. The ROW proposed for the Attleboro Alternative is variously owned by separate entities: the Executive Office of Transportation and Construction (EOTC) owns the Attleboro Secondary to Cotley Junction; the New Bedford Main Line and the Fall River Secondary are owned by CSX; the Northeast Corridor is owned by the MBTA. The track infrastructure condition varies, but no portions of the Attleboro, New Bedford, or Fall River lines are in acceptable condition for commuter rail service at required operating speeds.

Two service options were examined for the Attleboro Alternative: alternating service using standard train consists, and diesel multiple unit service (DMUs). The first alternatives/feasibility study also examined routing trains through the existing Attleboro Station, to avoid construction of a new bypass track. The existing station is located on the Shore Line, south of the Attleboro Secondary. In addition to the back-tracking time to reach the station, a 10-minute delay due to the "reverse move" would result, and would create significant operational constraints for Amtrak High-Speed rail service and for MBTA commuter rail service to Providence, R.I.

Alternating Service would use standard train consists (diesel engines and 5 to 9 commuter coaches), and would alternate service to New Bedford and Fall River, with 18 trains per day serving each terminal at intervals of 60 minutes during the peak periods. The number of trains was determined by an analysis of the capacity of the Shore Line, which was initially found to have capacity in the range of 36 trains per day. Travel times would be approximately 1 hour 20 minutes to each terminal city.

Diesel Multiple Unit (DMU) Service would use self-propelled rail cars that can operate in small one or two-car pairs or can be coupled with additional cars to make larger consists. For this alternative, DMUs originating at Fall River and New Bedford would meet and couple at the East Taunton Station. This ability to join smaller consists into larger trainsets would have the benefit of increasing service to each terminal without increasing train traffic. The use of DMU cars would provide the potential for twice as much service (36 trips per day) to each of the terminal cities, and would allow service at 30-minute intervals during peak periods. DMUs would increase travel time by 12 minutes, to allow for coupling of the DMUs and brake testing at the East Taunton Station. There are no DMUs currently approved for service on railroad lines in the United States.

3.3.2 Stoughton Alternatives

The Stoughton Branch Alternative, presented in this Draft EIR as the MBTA's preferred alternative is an extension of the existing Stoughton Line service. Stations sites includes stops at the existing Back Bay, Canton Junction, and Stoughton stations, and eight new station stops located in North Easton, Raynham, Dean Street (Taunton), East Taunton, Freetown, Fall River, Battleship Cove (Fall River) and New Bedford. A layover facility would be constructed in New Bedford. A layover facility was proposed for Fall River and described in the ENF. The MBTA is currently evaluating alternative sites in Freetown for this facility. This alternative would use existing active commuter rail tracks from South Station to the Stoughton Station. South of Stoughton Station, this alterntive would require the reconstruction of 14 miles of currently inactive track right-of-way from Brock Street, Stoughton to north of Winter Street in Taunton, and the upgrading and rehabilitation of 2 miles of existing freight rail lines from Winter Street to Weir Junction in Taunton, as well as upgrading existing freight rail infrastructure from Weir Junction to the terminal stations in Fall River and New Bedford.

Alternating Service would use standard train consists (diesel engines and 5 to 9 commuter coaches), and would alternate service to New Bedford and Fall River, with up to 20 trains per day serving each terminal at intervals of 60 minutes during the peak periods. Trains would run as expresses between Stoughton Station and Ruggles, and would not affect the level of service at existing Stoughton Line stations. The number of trains was determined by an analysis of the capacity of the Northeast Corridor, which was found to have additional capacity in the range of 36 trains per day. Travel times would be approximately 1 hour 15 (-20)minutes to each terminal city.

Diesel Multiple Unit (DMU) Service would use self-propelled rail cars that can operate in small one or two-car pairs or can be coupled with additional cars to make larger consists. For this alternative, DMUs originating at Fall River and New Bedford would meet and couple at the East Taunton Station. This ability to join smaller consists into larger trainsets would have the benefit of increasing service to each terminal without increasing train traffic. The use of DMU cars would provide the potential for twice as much service (34 trips per day) to each of the terminal cities, and would allow service at 30-minute intervals during peak periods. DMUs would increase travel time by 12 minutes, to allow for coupling of the DMUs and brake testing at the East Taunton Station. There are no DMUs currently approved for service on railroad lines in the United States.

3.3.3 Middleborough Alternatives

This family of alternatives would provide service from South Station to Lakeville via the Middleborough Line of the Old Colony Railroad. The number of trains would be limited by the capacity of the Old Colony Main Line north of Braintree. Service to New Bedford and Fall River would follow the existing Middleborough Secondary from Lakeville to Cotley Junction in East Taunton, and would diverge to the respective end points from Myricks Junction. The existing Lakeville Station is located south of Lakeville Junction, where the Middleborough Secondary diverges. Track, signals and bridge reconstruction would be required from Lakeville Junction to Cotley Junction, and south along both the New Bedford and Fall River lines. Service to New Bedford would require a 26-mile extension of the Middleborough Line service, with additional station stops at East Taunton and New Bedford. Service to Fall River would require a 23-mile extension of the Middleborough Line service, with additional station stops at East Taunton, Freetown, and Fall River. These alternatives would not stop in Taunton Center, and would require the East Taunton Station to be constructed either south of Cotley Junction or along the Middleborough Secondary, to avoid a "reverse move." The Middleborough Alternative would not provide service to the Back Bay Station, since the Old Colony Service uses right-of-way through Dorchester and South Boston.

Middleborough Line Alternative – Without Station Relocation (Reverse Move)

These alternatives would provide service from South Station to Lakeville via the Middleborough Line of the Old Colony Railroad . Service to New Bedford and Fall River would follow the existing Middleborough Secondary from Lakeville to Cotley Junction in East Taunton, and would diverge to the respective end points from Myricks Junction. The recently-constructed Lakeville Station would remain in its current location, south of Lakeville Junction. This would require that all trains to/from New Bedford or Fall River execute a "reverse move" at the Lakeville Station, a minimum 10-minute time delay. The use of DMUs was considered in the first feasibility study, but was rejected due to the capacity constraints that would result from carrying all Fall River, New Bedford and Old Colony passengers on a single train, and due to the 20-minute delay imposed by the need to couple DMU units twice (at East Taunton and at Lakeville).

Using standard train consists (diesel engines and 5 to 9 commuter coaches), this service would operate as an extension of the Old Colony Middleborough service. A total of 26 trains per day would operate (13 to each terminal city), with alternating consists departing Fall River and New Bedford at 60-minute intervals during peak periods. In addition, 5 peak-period trains would operate between the Lakeville Station and South Station. Travel times would be approximately 1 hour 36 (-40) minutes to each terminal city.

A second option, Skip-Stop/Cross-Platform Transfer, was developed to determine if New Bedford/Fall River service could operate in tandem with the Old Colony Middleborough Service, rather than as an extension. Trains would not stop at the Lakeville Station. This option would increase the number of peak period trains to New Bedford and Fall River, with trains alternately serving the two terminal cities at 60-minute intervals during the peak period direct from South Station (9 trains per day to each terminus). A shuttle would also operate between Fall River, East Taunton, and New Bedford, providing 30-minute headways to each terminal. Passengers from the shuttle would make a cross-platform transfer at East Taunton, boarding a through-routed train from the other terminal. Once on the Old Colony Line, the New Bedford/Fall River train would stop at alternating stations on the Middleborough Line (Bridgewater, Brockton, Holbrook, Quincy Center, JFK/UMass), while Middleborough trains would stop at Lakeville, Campello, Montello, Braintree, and JFK/UMass. Travel time between New Bedford or Fall River and South Station would be approximately 1 hour 30 minutes.

Middleborough Alternative – With Station Relocation

These alternatives would provide service from South Station to Lakeville via the Middleborough Line of the Old Colony Railroad . Service to New Bedford and Fall River would follow the existing Middleborough Secondary from Lakeville to Cotley Junction in East Taunton, and would diverge to the respective end points from Myricks Junction. The recently-constructed 432-car Lakeville Station would be relocated to north of the junction to eliminate the delay associated with a "reverse move". This station is currently being expanded to provide an additional 300 spaces.

Using standard train consists (diesel engines and 5 to 8 commuter coaches), this service would operate as an extension of the Old Colony Middleborough service. A total of 26 trains per day would operate (13 to each terminal city), with alternating consists departing Fall River and New Bedford at 60-minute intervals during peak periods. In addition, 5 peak-period trains would operate between the Lakeville Station and South Station. Travel times would be approximately 1 hour 26 minutes to each terminal city.

A second option, Cross-Platform Transfer, was developed to increase service. This option would increase the number of peak period trains to New Bedford and Fall River, with trains alternately serving the two terminal cities at 60-minute intervals during the peak period direct from South Station (9 trains per day to each terminus). A shuttle would also operate between Fall River, East Taunton, and New Bedford, providing 30-minute headways to each terminal. Passengers from the shuttle would make a cross-platform transfer at East Taunton, boarding a through-routed train from the other terminal. Travel time between New Bedford or Fall River and South Station would be approximately 1 hour 30 minutes.

3.3.4 Enhanced Bus Alternative

This alternative was evaluated to enhance the attractiveness of existing commuter bus service. It includes operational and capital improvements to the existing bus routes between Taunton, Fall River, New Bedford, and Boston.

Three private carriers currently provide commuter bus service from the New Bedford, Fall River, Taunton and other surrounding area communities and Boston. American Eagle provides service from New Bedford; Bonanza provides service from Fall River; and The Bloom Bus Co. provides service from Taunton. These bus services are assumed to continue providing service at competitive rates regardless of the commuter rail alternative selected.

The Enhanced Bus Alternative assumed that HOV lanes have been completed on the Southeast Expressway, and that transfers from MBTA-operated buses to the Boston MBTA Rapid Transit system are free. Elements of this alternative include expansion or creation of new park and ride lots at West Bridgewater (Route 24 and 106), Fall River, Freetown, East Taunton, Taunton, Raynham, and New Bedford. Park and Ride lots would be located at the sites identified as commuter rail stations in the Attleboro and Stoughton Alternatives.

This alternative would require the expansion of the new South Station bus facility to add new docking capacity required for an additional 26 buses during the AM peak hour.

3.4 Comparative Analysis

This section compares the 4 primary alternatives and their service options with respect to ridership, operations, impacts, and costs.

3.4.1 Ridership

Ridership was estimated for each of the alternatives described in Section 3.3, based on travel demand forecasting performed by the Central Transportation Planning Staff (CTPS)[5]. These estimates assume that existing commuter bus services continue to operate, and that these services would use the proposed MBTA stations.

As shown in Table 3.4-1, the Stoughton Alternative (standard consists) would attract the highest daily rail ridership of 4,325 rail boardings inbound to Boston, with 25 percent of these riders originating at the North Easton Station. The lowest ridership would be provided by the Middleborough Alternative with alternating service using the existing Lakeville Station. Only the Attleboro or Stoughton Alternatives would attract ridership at levels comparable to other MBTA commuter rail lines (3,500 to 11,750 riders per day). The commuter bus alternative would double existing bus ridership due to lower fares, free transfers to the MBTA rapid transit system, and increased commuter parking availability.

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[5] 1997 Expanded Alternatives Analysis

Ridership is assumed to be primarily work-related trips to downtown Boston, and does not include additional non-work trips or work trips within the study area. The analysis is therefore conservative.

Ridership projections are based on analysis of trip generation, trip distribution, mode choice, and use forecasts of population and employment, project highway travel conditions and downtown parking costs, and other projected transit services. A commuter's choice of transportation mode is assumed to be directly related to travel time, cost, and whether there is a need to change transit modes or vehicles within the trip to work. Increased travel time accounts for the lower ridership estimated for the DMU and cross-platform transfer options. Access to key employment destinations is also a factor, which accounts for the higher ridership of alternatives that provide access to the Back Bay Station.

Table 3.4-1
Rail Boardings by Station (2010)*

	Attleboro Alternative		Middleborough Alternative				Stoughton Alternative	
			Lakeville Station		Relocated Station			
Station of Origin	Standard	DMU	Service Extension	Skip/Stop Transfer	Service Extension	Transfer	Standard	DMU
Fall River	650	370	350	490	375	480	620	360
Freetown	475	250	165	275	175	270	430	240
New Bedford	700	400	390	585	415	570	600	380
East Taunton	860	1,450	415	695	445	710	875	1,100
Taunton Center	545	500	-	-	-	-	-	-
Dean Street	-	-	-	-	-	-	400	400
Raynham	-	-	-	-	-	-	300	300
North Easton	-	-	-	-	-	-	1,100	1,110
Total Rail Boardings	**3,230**	**2,970**	**1,320**	**2,045**	**1,410**	**2,030**	**4,325**	**3,890**

* Daily Inbound passengers, based on 1997 Expanded Alternatives Analysis

3.4.2 Operations

Operations along each of the 3 rail alternative alignments were assessed using a railroad industry-accepted computer simulation model (RAILSIM). This model developed travel times and service schedules for each alternative, and evaluated impacts to existing and planned rail service operations on the Northeast Corridor and Old Colony Line. The analysis was done for projected 2010 conditions, which take into account all planned and programmed rail service that are assumed to be in operation by 2010, including full Old Colony Line service, MBTA Worcester service, increased service along the Franklin Line, and additional Amtrak service along the Northeast Corridor.

3.4.2.1 Attleboro Alternative

The operations analysis showed that the Northeast Corridor has sufficient capacity to accommodate up to 44 additional trains per day originating at Attleboro without affecting Amtrak High-Speed Rail, MBTA commuter rail, or freight service. The Expanded Feasibility Study recommended that additional analysis of track capacity at South Station be investigated. The MBTA is currently conducting that analysis.

3.4.2.2 Stoughton Alternative

The operations analysis showed that the Northeast Corridor has sufficient capacity to accommodate up to 40 additional trains per day originating on the Stoughton Branch without affecting Amtrak High-Speed Rail, MBTA commuter rail, or freight service. The Expanded Feasibility Study recommended that additional analysis of track capacity at South Station be investigated.

3.4.2.3 Middleborough Alternative

The Middleborough Alternative is constrained by capacity limitations on the Old Colony Main Line north of Braintree. The three Old Colony lines from Middleborough, Plymouth and Greenbush merge in Braintree and proceed to South Station on a shared 9.8-mile segment of single track. The limited capacity of this segment constrains operations on the entire Old Colony system. Under projected 2010 conditions, the Main Line must accommodate 76 trains per day, with 5 trains per hour in the peak direction during peak periods.

Extension of the Old Colony Middleborough service to Fall River and New Bedford (with or without relocation of the Lakeville Station) was assumed to not add trains to the Old Colony system. This assumption is not likely to be achievable – additional trainsets would be likely to be needed to make up for the long distances of this extended service and to maintain schedules. Extension of service to New Bedford and Fall River would incorporate an additional 35 miles of track along each route, which would introduce increased delay throughout the entire Old Colony system. The single-tracked Main Line is the "choke point" for the entire system, where operations are the most severely constrained and where there is the least opportunity to recover from schedule delays. A single delay, which is almost unavoidable on a daily basis, could disrupt the tightly scheduled Main Line operations and impact operations on all three Old Colony branches. Schedule fluctuations on the Main Line segment could dead-lock service on all three Old Colony branches and affect the daily commute of more than 15,000 passengers.

The extension of the Middleborough Line to Fall River and New Bedford is not feasible due to train capacity limits. The maximum capacity of an 8-car MBTA train will be 1,500 passengers. By the year 2000, the Middleborough Line is forecast to carry 1,321 passengers on the peak train. The extension of service to Fall River or New Bedford would mean that the same train would be projected to carry 447 additional passengers – 14 percent over the train's capacity limit. Implementation of the cross-platform transfer at East Taunton would add 657 people to the peak period train, resulting in a passenger load 27 percent over capacity. Additional trains would be required to accommodate the projected ridership.

The operations analysis assumed that service would be provided on the Greenbush Line. The MBTA is currently committed to implementing Old Colony service on the Greenbush Line, as a requirement of the Commonwealth's mitigation for the Central Artery project. Greenbush service is a critical element of the State Implementation Plan (SIP) for air quality protection.

Additional train service was modeled to examine the feasibility, from an operations perspective, of adding more trains to the Old Colony Main Line (the Middleborough Alternative with skip/stop, cross-platform service described in Section 3.3.3). This analysis showed that some additional trains could *theoretically* be accommodated on the Main Line, but that the increased potential for delays would result in dead-locked service on the entire Old Colony Line.

At South Station, there are 2 platforms dedicated to the Old Colony system. These 2 platforms are situated to provide direct and efficient access to the Old Colony Main Line, and to avoid routing trains across South Station operations, which would increase the potential for operational delays. These 2 platforms are unable to accommodate any additional trains during the peak periods.

3.4.3 Cost Estimates

Costs for each alternative were assessed by estimating capital infrastructure costs (track, bridges, stations, signals, layover facilities, grade crossings), capital costs for equipment, and operating costs. The cost analysis (completed in early 1997) is based on 1996 dollars. Costs were annualized over the life of the project, with rail equipment assumed to have a vehicle life of 25 years and buses 12 years. Infrastructure costs were annualized over a 30-year period. Annual costs are offset by projected revenues, and calculated for comparative purposes as a cost per new rider. Table 3.4-2, below, provides a summary of cost estimates.

This analysis demonstrates that the Attleboro and Stoughton Alternatives are very similar in terms of total project cost, with the capital investment ranging from $407 to $410 million. Middleborough Alternatives with extension of existing Middleborough Old Colony Line service would have the lowest overall project costs for a rail alternative, assuming that no new rail vehicles were necessary. The Middleborough Alternative with additional trains (skip/stop –transfer) would require that the Main Line be double-tracked, estimated to have a total project cost of $436 million not including property acquisition and relocation. The enhanced bus alternative has the lowest overall project cost, which would include modifications to South station, construction of an additional 2,050 parking spaces, and the purchase of additional buses. DMU service would add an additional $8 to $10 million to the cost of each alternative, for construction of a dedicated maintenance facility.

Table 3.4-2
Summary of Costs (million $)

Alternative	Total Infrastructure Costs	Total Equipment Costs	Total Capital Cost	Annual Operations Costs	Total Annualized Costs	Daily Inbound Ridership	Cost per New Rider
Attleboro							
Standard	$355.7	$51.2	$406.9	$26.2	$62.6	3,230	$0.19
DMU	$365.8	$40.0	$405.8	$24.7	$60.9	2,970	$0.21
Stoughton							
Standard	$359.0	$51.3	$410.3	$23.0	$59.6	4,325	$0.13
DMUs	$371.7	$50.0	$421.7	$24.8	$61.5	3,890	$0.14
Middleborough – existing Lakeville Station							
Service Extension	$252.8	$39.8	$292.6	$7.9	$34.0	1,320	$0.29
Skip/Stop-Transfer	$379.3	$56.8	$436.1	$16.2	$55.2	2,045	$0.27
Middleborough – relocated station							
Service Extension	$265.4	$39.8	$305.2	$7.6	$34.8	1,410	$0.29
Extension with Transfer	$265.4	$43.4	$308.8	$11.9	$39.6	2,030	$0.19
Enhanced Bus	$13.0	$8.8	$21.8	$3.1	$4.8	3,500	$0.01

The Stoughton Alternative would be the most cost-effective commuter rail alternative, with a $130,000 investment per new transit rider. Only the enhanced bus service would generate revenue in excess of estimated operations cost.

3.4.4 Environmental and Social Impacts

Environmental and social impacts were assessed only for the two alternative determined to be feasible, and are described in detail in the ENF and in Chapter 4 of this Draft EIR:

- Stoughton Alternative, using standard alternating consists
- Attleboro Alternative, using standard alternating consists

Table 3.4-3
Summary of Impacts

Resource Affected	Stoughton Alternative	Attleboro Alternative
Air Quality (kg/day)		
CO Emission Reductions	99	73
VOC Emission Reductions	1777	722
Nox Emission Increases	838	1408
Noise Impacts (number)		
Moderate Impacts	183	449
Severe Impacts	66	173
Vibration Impacts (number)	215	245
Wetlands		
Wetland Loss (acres)	2.46	5.7
Bank Loss (linear feet)	2560	980
Bordering Land Subject to Flooding (ac)	0.56	0
Cultural Resources		
Historic Structures potentially affected	3	4
Archaeological Sites/Sensitive Areas	None	none
Rare Species Habitat Loss	3 species	None
Hazardous Materials (sites requiring further investigation)	4 stations	3 stations
Property Acquisition (acres)	72.9	58.4

As Table 3.4-2 demonstrates, the Stoughton Alternative would have equivalent or less impact with respect to the majority of environmental and social resources. The Stoughton Alternative would have fewer air emissions and greater air quality benefits, fewer noise and vibration impacts, fewer potential impacts to historic structures, and less loss of bordering vegetated wetland. This alternative would result in more loss of bank and floodplain, greater impacts to rare species, and may have more substantial indirect impacts to wildlife habitat in wetland areas.

3.5 Summary

The Stoughton Alternative was selected as the MBTA's preferred transportation alternative because it would have the highest ridership, resulting in the highest air quality benefits and would best meet the project's objectives. There are no substantial operational problems, and the Stoughton Alternative would be the most cost-effective alternative with the most favorable cost-per-new rider. However, environmental issues, particularly impacts to rare species habitat and indirect impacts to wetlands, will require careful design and construction. Table 3.5-1, below, provides a comparison of alternatives.

The Attleboro Alternative ranks second to the Stoughton Alternative with respect to ridership, air quality and transportation benefits, and its ability to meet the project's objectives. There are no substantial operational issues, and this alternative would provide a high level of cost-effectiveness. However, it traverses more highly-developed and populated areas, and would have more substantial noise impacts than the Stoughton Alternative.

The Middleborough Alternative was not selected because of severe operational constraints, low ridership, and a low ability to meet the project's objectives. The 1995 Feasibility Study and the February 1997 Middleborough Line Operations Simulation, examined service to either Fall River or New Bedford, and concluded that the Old Colony Railroad's single track north of Braintree had insufficient capacity to support the Old Colony service and trains from both Fall River and New Bedford. Only one additional train per half-hour could be scheduled along that line due to Old Colony service. Analysis indicated that no additional trains could be accommodated north of Braintree after 2000. Ridership on these lines is predicted to be substantially lower than for the preferred alternative due to increased travel time and the inability to stop at the Back Bay Station. This alternative would not provide a favorable balance of costs and benefits.

Environmental impacts associated with the Middleborough Alternatives would be the same as the other alternative with regard to the New Bedford and Fall River Line south of Cotley Junction and station construction at Freetown, Fall River and New Bedford. Layover facilities would be the same as for the preferred alternative. Relocation of the existing Lakeville Station and a variation of East Taunton Station are required for construction of the Middleborough Alternatives.

As shown in Table 3.4-1, the Middleborough Alternatives would have a lower equipment cost and capital cost than either the Attleboro or Stoughton Alternatives. Since the Middleborough Alternatives would be extensions of the Old Colony service to Lakeville, no new train sets would be required, although additional coaches and a spare locomotive would be required for each branch. Capital costs would be lower since all of the service would be on either the existing Old Colony Line or require upgraded track currently used for freight. No new track or ROW would be constructed.

The Enhanced Bus Alternative was not selected, as it did not provide the best balance of costs and benefits. Although this alternative had the lowest capital and operating costs, it had substantially lower new transit ridership than either the Attleboro or Stoughton Alternatives, and also provided fewer air quality benefits due to the lower reduction in Vehicle Miles Traveled (VMTs). It does not meet the project purpose of improving the regional transportation system.

Environmental impacts associated with construction of new park & ride lots would be minor. The commuter bus option would increase existing bus ridership by more than 100 percent. More than 3,500 passengers would use enhanced New Bedford, Fall River and Taunton bus service due to the lower fares, free transfers to the MBTA rapid transit system and increased commuter parking availability. An estimated 1,790 of these commuters would be new transit riders diverted from automobiles.

Ridership is estimated to be relatively high, due to enhanced service, more convenient park & ride access, and travel time improvements resulting from HOV lane usage. Travel times are estimated to be substantially less than the Commuter Rail alternatives. Costs are also low, due to the lack of major capital costs for track/bridge/signals improvement.

In summary, the MBTA's preferred alternative, the Stoughton Alternative, was selected because it would have the highest ridership and would be most cost-effective. The higher ridership provides the greatest air quality benefits and most reduction in automobile vehicle travel. The Attleboro Alternative ranks second to the Stoughton Alternative with respect to these transportation and cost criteria, but would require more loss of wetlands. The Middleborough Alternative is not feasible due to severe operational impacts on commuter rail service, low ridership, and poor cost-effectiveness. The enhanced bus alternative also has low ridership and does not meet the project purpose.

Table 3.5-1
Comparison of Alternatives

Alternative	Daily Ridership (inbound boardings)	Cost per New Rider ($ millions)	Operational Issues	Regional Transportation Capacity	Improved Employment Access
Attleboro					
Standard	3,230	$0.19	None	Enhances	Good
DMU	2,970	$0.21	None	Enhances	Good
Stoughton					
Standard	4,325	$0.13	None	Enhances	Good
DMUs	3,890	$0.14	None	Enhances	Good
Middleborough – existing Lakeville Station					
Service Extension	1,320	$0.29	Not feasible	Enhances	Fair (no Back Bay access: no Taunton Center access)
Skip/Stop-Transfer	2.045	$0.27	Not feasible	Enhances	Fair
Middleborough – relocated station					
Service Extension	1,410	$0.29	Not feasible	Enhances	Fair
Extension with Transfer	2,030	$0.19	Not feasible	Enhances	Fair
Enhanced Bus	3,500	$0.01	Requires South Station bus facility modification	No improvement	Fair

4

Environmental Impacts and Mitigation

This chapter of the DEIR addresses the environmental impacts from the proposed Stoughton Alternative, and contrasts these to impacts associated with the Attleboro Alternative. Environmental impacts include effects to wetlands, water quality, biodiversity, Areas of Critical Environmental Concern/Public Open Space, traffic, air quality, noise and vibration, historic and archaeological resources, and hazardous materials. Each topic is discussed in a separate section of this chapter. Mitigation is also proposed to compensate for unavoidable impacts to these environmental and social resources.

4.1 Wetlands

This section of the Draft Environmental Impact Report (DEIR) describes the existing wetland resources adjacent to the Stoughton Alignment and the Attleboro Bypass, and includes an analysis of the functions and values associated with the wetlands that would be directly altered by construction of these alternatives. Direct and indirect effects to wetlands are discussed. Measures incorporated in the proposed project design to minimize, mitigate and compensate for impacts to the wetland resource areas are described at the end of this chapter.

The Secretary's Certificate on the ENF determined that no further wetlands review under MEPA was required for improvements to the existing track and bridge system along the New Bedford, Fall River, or Attleboro Secondaries, or for any of the commuter rail stations described in the ENF. The Secretary found that review of these project elements could be adequately accommodated through the permitting process. For that reason, this section focuses on wetland impacts associated with elements of the project that were not included in the ENF, particularly the Stoughton Alternative alignment and stations between Stoughton Station and Weir Junction in Taunton and the relocated Freetown Station. This section also provides additional information on the Attleboro Bypass, at an equivalent level of detail to the information provided for the Stoughton Alternative, to facilitate an environmental comparison of these alternatives.

4.1.1 Existing Conditions

This section describes existing wetlands along the Stoughton Branch and the Attleboro Bypass. Existing wetlands along the Attleboro Secondary, New Bedford Main Line, and the Fall River Secondary were described in the ENF. No alteration of wetlands adjacent to these existing active rail lines will result from this project.

All wetlands were identified by field reconnaissance. The wetlands have been located by field delineation, in critical areas, and by approximate methods based on field identification and aerial photographs of the study area. The wetland boundary field delineations were conducted during May 1998 and later located by field survey and plotted on the base plans. The wetland delineations were performed in accordance with the Massachusetts Wetlands Protection Act (WPA) and Regulations, the DEP guidance document *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act*, and the 1987 Army Corps of Engineers *Wetland Delineation Manual*. All wetlands in this section are conservatively described as both state- and federally-regulated. Further investigation may show that some of the wetlands along the project alignment are federally-regulated only, but for the purpose of this DEIR all wetlands are considered both Bordering Vegetated Wetlands and federal wetlands.

Wetlands occurring within or encroaching upon the existing railway bed were field delineated and surveyed. The approximate locations of non-field delineated wetlands were based on a series of site visits between May 1998 and May 1999, interpretation of aerial photographs (taken 2 May, 1996, Eastern Topographics, scale 1:3,300), surveyed alignment plans, National Wetland Inventory mapping, USGS topographic maps, and NRCS county soil surveys. Except for Pine Swamp, all wetlands occurring adjacent to the existing railway bed, but not encroaching upon the bed, were located using approximate methods.

Abbreviated Notices of Resource Area Delineation (ANRADs) will be prepared for submittal to each of the municipal conservation commissions along the Stoughton Branch alignment (Stoughton, Easton, Raynham, Taunton) to confirm the identification and location of wetland resource areas. If the Attleboro Alternative were selected as the MBTA's preferred alternative, the MBTA would seek landowner permission to delineate wetlands and submit ANRADs to the Conservation Commissions of Attleboro and Norton for the Attleboro Bypass wetlands. Due to the planning-level analysis of this study, it is not practicable to fully delineate, survey, and obtain Commission review of wetlands along the entire length of the alternative until a preferred alternative has been determined and advanced into the design process.

4.1.1.1 Stoughton Branch

Seventy-two wetland systems subject to jurisdiction under M.G.L. c. 131, §40 (the Act) and Section 404 of the Federal Clean Water Act occur within or immediately adjacent to the Stoughton Branch alignment. Resource areas associated with these systems include Land Under Water Bodies and Waterways (LUWW), Bank, Bordering Vegetated Wetland (BVW), Bordering Land Subject to Flooding (BLSF), and Riverfront Area. Wetlands in the project vicinity are identified by location (towns: Stoughton – St, Easton = Ea, Raynham = Ra, Taunton = Ta) (*e.g.*, Wetland St3, Wetland Ra15). Figure 2.3-2 shows all wetlands identified along the Stoughton Branch.

Central Street to Plain Street (Stoughton)

Wetlands border the railway bed approximately 1,000 feet north of Plain Street. These wetlands occur on both sides of the railway bed for approximately 400 feet and do not encroach upon the grade. No Riverfront Area or 100-year floodplain occurs along this segment of the railway bed.

Plain Street to Stoughton Junction (Stoughton)

This segment of the railway is bordered by wetlands at several locations. Wetlands occur on both sides of the railway at the crossing of Whitman Brook, approximately 1,400 feet north of Stoughton Junction. Wetlands occur on the eastern side of the railway approximately 3,000 feet north of Stoughton Junction and border the grade for approximately 600 feet. A small wetland area occurs on the western side of the railway and is associated with an intermittent stream crossing approximately 4,000 feet north of Stoughton Junction. A small wetland borders the east side of the railway just south of Plain Street. None of these wetlands encroach upon the railway bed.

Wetland St6 occurs within the railway grade from the driveway to the Stoughton Fish and Game Club to a point 300 feet to the north. The Fish and Game Club driveway appears to have blocked drainage of the railway bed, enabling the formation of this wetland. Wetland St6 is regulated as BVW. Emergent and sparse scrub-shrub wetland vegetation and hydric soils are present within the railway grade. The wetland vegetation in this area is dominated by red maple, arrow wood, sensitive fern (*Onoclea sensibilis*), jewel weed and purple loosestrife (*Lythrum salicaria*). In addition, an intermittently flowing drainage ditch (Wetland St7), regulated as Bank, discharges from a wetland approximately 500 feet north of the Club driveway, and flows south along the west side of the grade. After flowing under the Club driveway, the ditch continues along the west side of the railway bed for approximately 430 feet then discharges into a wetland west of the railroad bed. These wetlands are within the Whitman Brook watershed.

There is no 100-year floodplain or Riverfront Area associated along this segment of the railway.

Wetlands in this segment are regulated as Bank and Bordering Vegetated Wetland in accordance with the WPA Regulations

Stoughton Junction to Elm Street (Stoughton/Easton)

This segment of the railway is bordered by wetlands associated with three stream crossings within this segment and with an open water body near Stoughton Junction. In the case of the stream crossings, wetlands border both sides of the railway, while wetlands border only the western side of the railway near Stoughton Junction. None of these wetlands encroach upon the railway grade.

Riverfront Area is associated with Whitman Brook (Wetland Ea5/6). Floodplain is associated with Whitman Brook and two unnamed tributaries to Whitman Brook (Wetlands St8 and Ea11). At Wetland Ea5/6, the floodplain elevation is designated as 131 feet[1] on the west side of the railway bed, while the floodplain elevation on the east side of the railway bed is 128 feet. Riverfront Area is associated with Whitman Brook. No elevation is designated for the floodplain of the unnamed tributaries. The FEMA map shows the railway bed as inundated by the 100-year storm event at these locations.

Elm Street to Bridge Street (Easton)

Wetlands Ea13 and Ea14 occur within the railway grade north and south of Main Street in Easton, respectively. In this area, the filling in of the former underpass below the Main Street bridge and lack of adequate maintenance have blocked drainage, causing the areas to become wetlands. In Wetland Ea13, BVW occurs within the railway grade for approximately 40 feet north of Main Street. Standing water, emergent, and sparse scrub-shrub wetland vegetation, and hydric soils occur in the railway grade for approximately 300 feet south of Main Street (Wetland Ea14). Because a culvert under Main Street conveys flow from this area to an intermittent stream on the northern side of the street, this area is regulated as BVW. The vegetation in this area is predominantly jewelweed and arrowwood. Bank also occurs north of Main Street. These wetlands are in the watershed of Queset Brook, which is to the north.

The intermittent stream that flows northward from a culvert under the filled Main Street Bridge flows in the center of the grade for approximately 40 feet north of

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[1] All floodplain elevations are based on the National Geodetic Vertical Datum of 1929.

Main Street and then crosses the eastern side of the grade where it enters a culvert and flows to an unknown discharge location. Because this stream is downstream of wetland resource areas it is regulated as Bank. Bordering Vegetated Wetland is associated with this channel, and the entire width of the 40-foot segment of wetland in the rail bed just north of Main Street is regulated as such. The alignment crosses Queset Brook approximately 450 feet north of Main Street. Riverfront Area is associated with Queset Brook.

Along this segment of the railway, 100-year floodplain is associated with Queset Brook (Wetland Ea12). The FEMA map designates the 100-year floodplain elevation at this point at 137 feet on the west side of the alignment and 135 feet east of the alignment.

Wetlands in this segment are regulated as Bank, Bordering Vegetated Wetland, Land Under Water, Bordering Land Subject to Flooding, and Riverfront Area in accordance with the WPA Regulations.

Bridge Street to Short Street (Easton)

Wetlands border both sides of the grade for approximately 1,000 feet, just north of Short Street. Approximately 630 feet north of Short Street the railway grade crosses Queset Brook, a perennial waterway. Wetlands also border both sides of the grade approximately 2,000 feet south of Bridge Street, but none of these wetland areas encroach on the grade.

Riverfront Area along this segment of the railway is associated with Queset Brook.

This segment of the existing railway bed crosses 100-year floodplain just north of Short Street. The FEMA map designates the elevation for this area as 108 feet. At this location the railway alignment is not inundated during the 100-year storm event.

Short Street to Purchase Street (Easton)

Wetlands occur on both sides of the grade just south of Depot Street for approximately 400 feet. North of Depot Street, two wetlands occur on the eastern side of the grade and one wetland occurs on the western side of the grade. These wetlands do not encroach upon the railway grade. An intermittent stream originates within a wetland approximately 600 feet south of Short Street and travels east under the railroad bed.

Along this segment of the railway, 100-year floodplain borders the east side of the railroad grade. The FEMA map does not provide an elevation for this floodplain area; however this floodplain area is not shown as encroaching upon the railway grade during the 100-year storm event.

Purchase Street to Prospect Street (Easton)

During a spring site walk, water was observed flowing northward in a depression in the center of the bed along this segment. This depression has been cut into the bed by motorcycle and foot travel, and is not connected to any naturally occurring channel, and does not flow out of a Bordering Vegetated Wetland. During a subsequent summer visit, the depression was dry, vegetated entirely by upland plant species, and contained upland soils. Therefore, this depression is not a wetland resource area.

There is no Riverfront Area or 100-year floodplain along this segment of the railway.

Prospect Street to Foundry Street (Easton)

The majority of this segment is surrounded by a golf course. The right-of-way crosses Black Brook twice, and a tributary to Black Brook once in this segment. All three crossings are perennial streams. The first Black Brook crossing (Wetland Ea31) is approximately 200 feet south of Prospect Street. The second Black Brook crossing (Wetland Ea32) is approximately 2,600 feet north of Foundry Street. The structure that conveyed Black Brook under the railroad embankment has entirely washed out in this location. The grade is bordered by wetlands on both sides for approximately 650 feet north of the washed-out culvert. Approximately 800 feet north of Foundry Street, the right-of-way crosses a tributary to Black Brook. Both sides of the embankment are bordered by wetlands associated with the Black Brook tributary for approximately 300 feet.

Along this segment of the railway, Riverfront Area is associated with all three perennial streams.

Floodplain is associated with Black Brook and its tributary. The railway bed is shown as inundated on the FEMA map by the 100-year flood at the three crossings (Wetlands Ea31, Ea32, and Ea35) that occur along this segment of the railway. At the railway's first crossing of Black Brook (Wetland Ea31), floodplain occurs on both sides of the railway and is designated as 82 feet. Between the railway's first and second crossing of Black Brook, 100-year floodplain occurs on the east side of the railway, with a small portion of floodplain on the west side of the alignment. At the second crossing of Black Brook, the elevation is designated as between 77 and 79 feet. The FEMA map designates the base elevation of the 100-year flood for the tributary to Black Brook as approximately 78 feet.

Foundry Street to Dog Track Access Road (Raynham/Easton)

This segment of the Stoughton Alignment is within the Hockomock Swamp ACEC. The Hockomock Swamp wetlands occur on the east and west sides of the grade for the majority of the segment. The railroad bed crosses Black Brook, a perennial stream, approximately 1,250 feet south of a power line right-of-way.

The entire segment of the railway alignment is bordered by 100-year floodplain within Hockomock Swamp. The FEMA map does not designate a base flood elevation for the 100-year flood in this area. It indicates, however, that the entire railway grade within the Hockomock Swamp is above the 100-year floodplain elevation.

Dog Track Access Road to Bridge Street (Raynham)

This segment of the Stoughton Alignment is within the Hockomock Swamp ACEC. Wetlands occur consistently within the railway grade for 1,900 feet south of a Raynham/Taunton Greyhound Park internal access road (Wetland Ra1). At the southern end of this section, an intermittent stream flows into the right-of-way from a wetland on the east side of the railway. From this point, the stream flows down the center of the railway bed until it reaches the access road, where it crosses under the road via a culvert on the east side of the railway bed. The stream continues north, eventually flowing into the Hockomock Swamp. This stream varies in width between two and ten feet, is less than six inches in depth, and has a gravelly, unvegetated bed. The stream is bordered by scrub-shrub wetlands on both sides of the railway bed that are approximately five to ten feet wide. The wetlands in this area contain a variety of hydrophytic vegetation including red maple, speckled alder (*Alnus rugosa*), meadow sweet (*Spiraea latifolia*), common reed (*Phragmites australis*), jewelweed, and lurid sedge (*Carex lurida*).

This wetland is regulated as Bank and Bordering Vegetated Wetland in accordance with the WPA Regulations.

Bridge Street to Carver Street (Raynham)

Wetlands border the majority of the grade between Carver Street and I-495. These wetlands do not encroach upon the railway grade. The only wetland resource areas that occur between I-495 and Bridge Street are drainage ditches that flank both sides of the grade. These drainage ditches are likely federally regulated because they contain hydric soils and hydrophytic vegetation; however, these wetlands are isolated and too small to be regulated under the MA Wetlands Protection Act.

Carver Street to Route 138 (Raynham)

The majority of this segment is bordered by wetlands on both sides of the railroad grade. The wetlands along this segment do not encroach upon the railway grade.

A small amount of 100-year floodplain occurs in association with the wetland resource areas along this segment of the alignment (Wetland Ra7). The FEMA map does not designate base flood elevations for this floodplain area. However, this area is a small lobe with an outlet east of the Alignment. The 100-year floodplain elevation is 80 feet at the outlet.

Route 138 to King Phillip Street (Raynham)

Wetlands border the east and west sides of the grade for 800 feet approximately 1,500 feet north of King Phillip Street. These wetland resources do not encroach upon the railway grade.

King Phillip Street to East Britannia Street (Raynham)

The majority of this segment is within Pine Swamp. Wetlands occur immediately adjacent to the toe of slope on the east and west sides of the grade but do not cross the railroad bed. The railway crosses Pine Swamp Brook approximately 1,400 feet south of King Phillip Street. The wetlands along the Stoughton Alignment within Pine Swamp have been field delineated and surveyed.

The entire segment of the railway within the Pine Swamp is within the FEMA-mapped 100-year floodplain. The FEMA map does not designate a 100-year base flood elevation for the Pine Swamp. However, the only hydrologic outlet from Pine Swamp is to Kings Pond to the northeast. The 100-year floodplain elevation at this outlet is 54 feet. Assuming the 100-year flood elevation for the Pine Swamp is 54 feet, the lowest elevation of the existing railway bed is approximately 1.5 feet above the 100-year floodplain and is therefore above the 100-year flood elevation and would not be included in Bordering Land Subject to Flooding.

East Brittania Street to Longmeadow Road (Raynham/Taunton)

Wetlands occur in several locations along the section of the Stoughton Branch just south of Pine Swamp, between Longmeadow Road and East Brittania Street, in Taunton and Raynham. The northern 650 feet of this portion of the railway grade was located in a cut section to accommodate the underpass at Thrasher Street.

Subsequent filling under the Thrasher Street Bridge and lack of drainage system maintenance has resulted in portions of the railway bed becoming wetland. Wetland Ta1 occurs within this section of the Stoughton Alignment.

Between Thrasher Street and East Britannia Street, the right-of-way has not been maintained and is extremely overgrown. This segment was originally constructed through wetland areas and the railroad bed appears to have subsided, allowing wetlands to encroach along the western and eastern edges of the railway grade and, in some locations, across the entire railway bed. Wetlands Ra15, Ra16, and Ra17 occur within this section of the railway bed.

The forested wetlands in this area are dominated by red maple (*Acer rubrum*), northern arrowwood (*Viburnum dentatum*), highbush blueberry (*Vaccinium corymbosum*), winterberry (*Ilex verticillata*), poison ivy (*Toxicodendron radicans*), and jewelweed (*Impatiens capensis*). This section is within the watershed of an unnamed stream west of the alignment that is tributary to the Taunton River.

These wetlands are regulated as Bordering Vegetated Wetland in accordance with the WPA Regulations.

Dean Street to Weir Junction (Taunton)

Along this segment, the right-of-way crosses the Little River once and the Taunton River three times, on existing bridges used to convey freight train traffic. Wetland areas are associated with both rivers. Wetland Ta6 is the Taunton River and Ta7 is the Little River. Wetland resource areas are adjacent to the Little River on both sides of the grade. Between the north and middle crossings of the Taunton River, wetland areas occur on both sides of the grade. None of the wetland areas adjacent to this segment of the alignment encroach upon the grade. The river crossings are all bridged.

Two areas of 100-year floodplain occur within this segment of the alignment. These floodplains are associated with both wetlands (Ta6 and Ta7). The 100-year base flood elevation for both of these floodplains is 13 feet. Under existing conditions, portions railroad bed between the southern crossing of the Taunton River and the Little River are inundated during the 100-year storm event. Portions of this area are also regulated as Riverfront Area.

4.1.1.2 Attleboro Bypass

Thirteen freshwater wetlands were identified in the 1995 ENF along the proposed Attleboro Bypass corridor. Figure 2.3-4 shows all wetlands identified along the

Attleboro Bypass. Wetlands within the existing powerline ROW possess mound and pool topography with emergent vegetation and clusters of shrubs dominating the ground cover. The emergent vegetation includes swamp azalea (*Rhododendron viscosum*), cattail (*Typha latifolia*), common reed (*Phragmites communalis*), wool-grass (*Scirpus cyperinus*), shallow sedge (*Carex lurida*), woolly-fruit sedge (*Carex lasiocarpa*), soft rush (*Juncus effusus*), New York fern (*Thelyptris novaboracensis*), Massachusetts fern (*Thelypteris simulata*), royal fern (*Osmunda regalis*), sphagnum moss, and poison ivy (*Rhus radicans*). The shrubs include meadow sweet (*Spiraea latifolia*), steeple bush (*Spiraea tomentosa*), arrowwood (*Viburnum dentatum*) sweet pepperbush (*Clethra alnifolia*), and highbush blueberry (*Vaccinium corymbosum*). The dominance of emergent and shrub vegetation is a result of right-of-way maintenance activities conducted by New England Power Company.

Wetlands outside of the Powerline ROW are forested and dominated by red maple trees with highbush blueberry, sweet pepperbush, arrowwood, cinnamon fern (*Osmunda cinnamomea*), fetter bush (*Lyonia lucida*), jewelweed (*Impatiens capensis*), and skunk cabbage (*Symplocarpus foetidus*) composing a dense understory. Mound and pool topography is pronounced in level to nearly level areas, while gently sloping areas exhibit scouring and exposed rocks.

4.1.1.3 Wetland Functions and Values

Wetlands, watercourses and waterbodies may provide a variety of functions and values, such as wildlife habitat, fish habitat, visual/aesthetic quality, water-based recreation, flood storage and storm damage prevention, groundwater and surface water quality and quantity, pollutant attenuation through nutrient retention and sediment trapping, shoreline stabilization and dissipation of erosive forces. Ecological functions and societal values vary with each wetland. Factors affecting wetland function include size, location in the watershed, number and interspersion of plant cover types, and the degree of disturbance.

The Massachusetts Wetlands Protection Act Regulations establish presumptions of the significance of each wetland resource area to the interests of the Wetlands Protection Act and presumes that all wetlands provide these functions. Although the presumptions of significance are not disputed, the functions performed by the wetlands that would be altered by the proposed project were analyzed and presented in the following sections to determine the extent to which the wetlands contribute to these interests.

The ACOE's New England Division has prepared a method for the assessment of functions and values (*The Highway Methodology Workbook Supplement, Wetland Functions and Values - a Descriptive Approach*).

Wetlands in the study area that are likely to be affected by placement of fill were evaluated in terms of the functions they provide. Due to the large number of wetlands within the study area, components of the ACOE methodology in concert with professional judgement were used to evaluate each wetland for eight general functions or values. The following paragraphs discuss wetland characteristics that contribute to a wetland's ability to perform each of these eight general functions. A functional assessment of the affected project-area wetlands is provided in Table 4.1-1.

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Table 4.1-1
Functional Assessment of Affected Project-Area Wetlands

Wetland	Location	Floodflow	Fish/Shellfish	Sediment/	Nutrient	Production	Wildlife	Recreation	Uniqueness/
St1/2	Britton Pond Brook	No	Yes	No	No	No	No	Yes	No
St6	Fish and Game Club	No	No	No	No	No	No	No	No
St7	Fish and Game Club	Yes	No	No	Yes	No	No	No	No
St8	Whitman Brook Tributary	Yes	Yes	No	Yes	Yes	Yes	Yes	No
Ea5/6	Whitman Brook	Yes	Yes	No	Yes	Yes	Yes	Yes	No
Ea11	Whitman Brook Tributary	Yes	Yes	No	Yes	Yes	Yes	Yes	No
Ea12	Queset Brook	Yes	Yes	No	Yes	Yes	Yes	Yes	No
Ea13	Main Street (north)	No	No	Yes	No	No	No	No	No
Ea14	Main Street (south)	No	No	Yes	No	No	No	No	No
Ea23/24	Queset Brook	Yes	Yes	No	Yes	Yes	Yes	Yes	No
Ea31	Black Brook	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Ea32	Black Brook	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Ea35	Black Brook Tributary	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Ea37	Black Brook	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Ra1	South of Dog Track Access	No	No	Yes	No	No	Yes	No	No
Ra7	Between Carver St. and Rt.	No	No	No	No	No	No	No	No
Ra12	Pine Swamp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ra13	400 feet south E. Brittania St.	No	No	Yes	No	No	No	No	No
Ra14	175 feet south E. Brittania St.	No	No	Yes	No	No	No	No	No
Ra15	650 feet south of E. Brittania	Yes	No	Yes	No	Yes	Yes	No	No
Ra16	750 feet south of E. Brittania	Yes	No	Yes	No	Yes	Yes	No	No
Ra17	50 feet north of Thrasher St.	Yes	No	Yes	No	Yes	Yes	No	No
Ta1	20 feet south of Thrasher St	Yes	No	Yes	No	No	Yes	No	No
Ta6	Taunton River	Yes	Yes	No	No	No	Yes	Yes	No
Ta6	Taunton River	Yes	Yes	No	No	No	Yes	Yes	No
Ta6	Taunton River	Yes	Yes	No	No	No	Yes	Yes	No
Ta7	Little River	Yes	Yes	No	No	No	Yes	Yes	No

Floodflow Alteration (Storage/Desynchronization)

Wetlands can be important in the storage and desynchronization of floodwaters, protecting downstream resources from flood damage. Wetlands high in the watershed with constricted outlets or closed basins are generally important in capturing and detaining floodwaters. Other wetland characteristics that contribute to flood storage and desynchronization include broad floodplains and plant communities consisting of low, dense vegetation.

Study area wetlands designated as having floodflow desynchronization functions were classified by considering the local topography (broad, relatively flat areas), size, presence of ponded water, contiguous/branched channels, well vegetated floodplains along rivers and larger streams, and position in the landscape.

Fish and Shellfish Habitat (Aquatic Diversity/Abundance)

Large wetlands, which are contiguous to a large, perennial stream or waterbody capable of supporting large fish and/or shellfish populations are important in providing Aquatic Diversity/Abundance. Other wetland characteristics which contribute to Aquatic Diversity/Abundance include good water quality, an abundance of shoreline vegetation, objects or vegetation which provide cover, spawning areas such as beds of submerged aquatic vegetation or gravel beds, and the lack of barriers such as dams and waterfalls which prevent fish movement.

Sediment/Toxicant Retention (Pollutant Attenuation)

Wetland basins with permeable soils that detain storm and flood waters and promote percolation, reduce runoff rates sufficiently to allow sediments and the adsorbed toxicants to settle from the water column. Diffuse channels, deep pools, and dense low vegetation are wetland characteristics which may also contribute to this process by slowing water velocities.

Nutrient Removal/ Retention/Transformation (Pollutant Attenuation)

Wetlands can serve as a filter for the removal or detention of nutrients carried in surface water flows. Many wetland plants respond to high nutrient concentrations with accelerated growth rates. Some nutrients are assimilated in plant material while others are deposited in wetlands as organic sediment traps them by chemical, physical, and biotic actions.

Study area wetlands designated as having nutrient removal functions were classified by the presence of large areas of open or ponded water with dense emergent vegetation, meandering streams with slow water velocities (supporting aggradation), and contiguous/branched channels.

Production Export (Nutrient)

Production export is the production of organic material and its subsequent transport out of a wetland to downstream areas or to deeper waters within the basin. This organic material is then added to the food chain where it is eaten by fish and other aquatic organisms. Wetlands with dense vegetation dominated by non-persistent emergent vegetation are important in supplying downstream wetlands with organic material. Wetlands dominated by shallow marshes with a perennial stream flowing from them are most important in providing production export. Wetlands designated as having production export functions were classified by the presence of high densities and diversity of hydrophytic vegetation, presence of abundant fish and wildlife and downstream/downgradient evidence of export.

Wildlife Habitat

Large, undisturbed wetlands greater than 10 acres are generally considered to provide wildlife habitat. Other factors that contribute to the provision of important wildlife habitat include the presence of greater than 3 acres of shallow, permanent open water of good quality; proximity to undisturbed upland wildlife habitat; a high degree of interspersion of vegetation classes; a high degree of species and structural diversity within the vegetational community; high vegetation density; and the presence of wildlife food plants. Wetlands which are contiguous to other wetland areas may serve as travel or migratory corridors for wetlands wildlife. Presence of vernal pools (ephemeral bodies of water that lack fish populations) connote a high wildlife value because several wildlife species, in addition to the obligate vernal pool species such as wood frog *(Rana sylvatica*) and ambystomid salamanders, use vernal pools and the areas immediately adjacent for feeding, cover, courtship, and overwintering habitat.

Size, adjacent land use, water quality, and presence of vernal pools were used to classified wetlands designated as wildlife habitat for waterfowl, reptiles and amphibians, terrestrial bird species, and mammals. Smaller wetlands, less than 5 acres, supporting populations of waterfowl, reptiles and amphibians, and terrestrial bird species and mammals, were classified using the same criteria.

Uniqueness/Heritage

The Uniqueness/Heritage function includes considerations of science, the endangerment of the wetland, and the importance of the wetland in the context of its local and regional environment. The wetland may contain areas of archaeological, historical, or social significance, or it may represent the last fragment of its wetland type in an urbanized or agricultural environment. The presence of relatively scarce wetland habitats or wetland species contributes to the Uniqueness/Heritage function provided by the wetland. Areas containing estimated habitats or priority sites mapped by MNHESP confer a higher value in this category.

Recreation (Consumptive/Non-Consumptive)

Wetlands designated as having Recreational value were classified based on the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting and other active or passive recreational activities. Consumptive opportunities, such as fishing and hunting, consume or diminish the plants, animals, or other resources that are intrinsic to the wetland. Non-consumptive opportunities do not consume or diminish these resources of the wetland.

4.1.2 Impacts to Wetlands

This section describes direct and indirect impacts to wetland resource areas that would result from construction of the proposed project. Direct impacts consist of wetland fill and work within wetlands; indirect effects include secondary (qualitative) effects as a result of construction.

Under the proposed design, the most substantial impacts to wetland resource areas will result from reconstruction of the railway where wetlands occur within the existing railway bed as a result of lack of maintenance since rail service ceased, as well as from construction of the Morton Street/Totman Farm Road Access Road. Additional, minor impacts to wetlands will result from reconstruction of bridges and culverts over waterways and in some areas where wetlands are in very close proximity to the existing railway bed toe-of-slope. In all of these cases, losses of wetlands have been minimized to the greatest extent possible.

Table 4.1-2 provides a summary of the resource areas in each wetland likely to be affected.

4.1.2.1 Stoughton Alternative

Construction of the Stoughton Alternative will affect wetland resource areas at several locations as a result of track reconstruction. These impacts are unavoidable, and generally occur where the former railroad bed is in a cut section and changes subsequent to its abandonment have altered drainage patterns and caused the railbed to develop a wetland hydrology and vegetation. This section categorizes all potential losses of wetland resources by resource type and addresses impacts to wetland functions.

Table 4.1-2
Summary of Affected Wetland Resources (Stoughton Branch)

Wetland	Location	Bordering Vegetated Wetland	Bank	Land Under Water	Bordering Land Subject to Flooding	Riverfront Area
St1/2	Britton Pond Brook	X		X		X
St3	400 feet south of MacPherson Rd.	X				
St4	500 feet north of Morton St.	X				
St6	Fish and Game Club	X	X			
St7	Fish and Game Club	X	X			
St8	Whitman Brook Tributary					
Ea5/6	Whitman Brook	X	X	X		X
Ea11	Whitman Brook Tributary			X		
Ea12	Queset Brook			X		X
Ea13	Main Street (north)	X				
Ea14	Main Street (south)	X				
Ea23/24	Queset Brook		X	X		X
Ea28	150 feet south of Depot St.	X				
Ea31	Black Brook			X	X	X
Ea32	Black Brook		X	X	X	X
Ea35	Black Brook Tributary			X	X	X
Ea37	Black Brook			X		X
Ra1	South of Dog Track Access Rd.	X	X			
Ra7	Between Carver St. and Rt. 138				X	
Ra12	850 feet north of E. Brittania St.	X				
Ra13	400 feet south E. Brittania St.	X				
Ra14	175 feet south E. Brittania St.	X				
Ra15	650 feet south of E. Brittania St.	X				
Ra16	750 feet south of E. Brittania St.	X				
Ra17	50 feet north of Thrasher St.	X				
Ta1	20 feet south of Thrasher St.	X				
Ta6	Taunton River			X		X
Ta6	Taunton River			X		X
Ta6	Taunton River			X		X
Ta7	Little River			X		X

Loss of Bordering Vegetated Wetland

As defined at 310 CMR 10.55(2)(a), *"Bordering Vegetated Wetlands are freshwater wetlands which border on creeks, rivers, streams, ponds and lakes."* Bordering Vegetated

Wetland boundaries are defined in 310 CMR 10.55(2)(c) as *"... the line within which 50% or more of the vegetational community consists of the wetland plants and saturated or inundated conditions exist."*

Construction of the Stoughton Branch would result in the loss of Bordering Vegetated Wetlands in 12 wetlands at 5 locations. Minor sliver impacts may occur in 4 other wetlands (Wetlands St1/2, St3, St4, and Ra12) but these impacts would total less than 0.05 acres. As the project design progresses it may be possible to avoid filling these wetlands, therefore, they are not considered in the quantification of wetland loss.

One of filled wetlands (RA1) is within the limits of the ACEC, and contains a stream that is tributary to the Hockomock Swamp. Under the proposed design, direct alteration of Bordering Vegetated Wetlands would primarily occur where wetland resource areas occur within the railway bed, making avoidance of the impacts infeasible. Other impacts to wetland resource areas regulated by the WPA occur where the right-of-way crosses perennial rivers or streams. No impacts to BVW are anticipated from the proposed stations. The following sections discuss each of these types of wetland impact. The proposed project will not result in the placement of fill or alteration of vegetation in wetlands within the Pine or Hockomock Swamps. Table 4.1-3 provides a summary of the wetland loss from the proposed project.

Table 4.1-3
Summary of Loss of Bordering Vegetated Wetlands

Location	Approx. Station Locations (feet)	Wetland	Wetland Loss (acres)
Fish and Game Club	1095 + 00 to 1102 + 80	St6, St7	0.35
Main Street in Easton	1231 + 00 to 1237 + 50	Ea13, Ea14	0.25
South of Depot Street (Route 138)	1338 + 00 to 1340 + 80	Ea28	0.09
South of Dog Track Access Road	1553 + 00 to 1572 + 00	Ra1	0.79
Between E. Brittania Street and Winter Street	1777 + 00 to 1797 + 50	Ra13, Ra14, Ra15, Ra16, Ra17, Ta1	0.98
Total			**2.46**

In accordance with the Massachusetts Wetlands Protection Act Regulations, Bordering Vegetated Wetlands are presumed to be significant to public and private drinking water supply, pollution prevention, groundwater supply, flood control, storm damage prevention, protection of fisheries, protection of land containing shellfish, and protection of wildlife habitat.

The proposed project would alter Bordering Vegetated Wetland within or adjacent to the following segments of the Alignment:

- Stoughton Fish and Game Club (Wetlands St6 and St7 in Stoughton),
- Main Street (Wetlands Ea13 and Ea14 in Easton),
- South of Depot Street (Wetland Ea28 in Easton)
- South of dog track access road (Wetland Ra1 in Raynham),
- Between East Brittania Street and Winter Street (Wetlands Ra13, Ra14 Ra15, Ra16, RA17, and Ta1 in Raynham and Taunton).

The Bordering Vegetated Wetlands within the railway bed near the Stoughton Fish and Game Club, in the vicinity of Main Street (Easton), and south of the dog track access road, consist primarily of sparse emergent and scrub-shrub vegetation supported primarily from inadequate drainage conditions resulting from inadequate maintenance of drainage structures. Wetland Ea28, nestled between Depot Street and Purchase Street, was likely once connected to Wetland Ea29 on the east side of the embankment, but was separated by original construction of the rail. In this location the wetland has encroached onto the railway bed.

The Bordering Vegetated Wetlands between East Brittania Street and Winter Street are connected to relatively undisturbed systems outside the railway bed (Wetlands Ra13, Ra14, Ra15, Ra16, Ra17 and Ta1). The following paragraphs examine each of these interests with respect to the project area wetlands.

- The wetlands in the vicinity of Main Street in Easton and the Stoughton Fish and Game Club are within Zone II Wellhead protection areas. While undisturbed wetlands within Zone II Wellhead protection areas are likely to be significant to the protection of water supplies, disturbed wetlands such as these are likely to provide only limited protection for the water quality of the wellhead protection area.

- Because groundwater recharge may seasonally occur in portions of these wetland systems, all bordering vegetated wetlands in the project area are presumed to be significant to groundwater supply.

- Wetlands St6, St7, Ea13, Ea14, Ea28, Ra13, Ra14, Ra15, Ra16, Ra17 and Ta1 receive stormwater runoff that may contain pollutants from roadways, agricultural areas, and residential or commercial development. However, disturbed wetlands such as St6, St7, Ea13, and Ea14 are likely to provide only limited prevention of pollution.

- None of the Bordering Vegetated Wetlands that would be altered by the proposed project are within mapped 100-year floodplains, nor do they have constricted outlets or storage capacity. Therefore, they are not likely to be significant to the prevention of storm damage or contribute to flood control.

- None of the Bordering Vegetated Wetlands that would be altered by the proposed project border perennial streams or rivers. Therefore, they are not likely to be significant to fisheries.

- None of the wetlands within the project area are directly tributary to any areas that support shellfish.

- All Bordering Vegetated Wetlands within the project area are likely to be contribute to the protection of wildlife habitat. However, disturbed wetlands such as St6, St7, Ea13, and Ea14 are likely to provide only limited wildlife habitat.

Work Within Land Under Water

Land Under Water Bodies and Waterways *"is the land beneath any creek, river, stream, pond or lake. Said land may be composed of organic muck or peat, fine sediments, rocks or bedrock. The boundary of Land Under Water Bodies and Waterways is the mean annual low water level"* [310 CMR 10.56 (2)(a)&(c)].

Reconstruction of the Stoughton Branch will result in minor amounts of impact to Land Under Water. These impacts will occur at perennial waterways where bridges and culverts must be replaced. Preliminary analysis indicates that the three Taunton River bridges and the bridges over the Little River, Whitman Brook, and Queset Brook will be replaced. New substructures (including abutments and piers) will be constructed, supported by pile foundations where they currently exist.

All culverts along the project alignment will be replaced in kind. Replacing these structures in kind will substantially limit impacts to Land Under Water. No impacts to Land Under Water are anticipated from the proposed stations.

- Under the Massachusetts Wetlands Protection Act, Land Under Water Bodies and Waterways (LUW) is presumed to be significant to public and private drinking water supply, pollution prevention, groundwater supply, flood control, storm damage prevention, protection of fisheries, and protection of wildlife habitat. None of the wetlands occurring within the railway bed contain LUW, while replacement of culverts and bridges over perennial water bodies will cause minor impacts to LUW..

Work Within Bank

- A Bank is *"... the portion of the land surface that normally abuts and confines a water body ."* This land surface *"... may be partially or totally vegetated, or it may be comprised of exposed soil, gravel, or stone." "The upper boundary of a Bank is delineated as the first observable break in the slope or the mean annual flood level, whichever is lower"* [310 CMR 10.54 (2)(a)&(c)].

The proposed project would result in impacts to Bank where this resource area occurs within the railway bed, making avoidance of the impacts infeasible. Other, minor impacts to Bank would result where culverts and bridges must be replaced. One of the culverts conveying the Black Brook has completely washed out, and replacing this culvert will result in Bank impacts. Minor impacts to the intermittent Bank in Ra1 are expected from construction of the Raynham Station. Table 4.1-4 summarizes the impacts to Bank from the proposed project.

Table 4.1-4
Summary of Impacts to Bank

Location	Approx. Station Location (feet)	Wetland	Bank Impact (linear feet)
Fish and Game Club	1093 + 00 to 1140 + 50	St6, St7	945
Main Street in Easton	1234 + 00 to 1230 + 00	Ea13, Ea14	15
Black Brook	1401 + 00	Ea32	90
South of Dog Track Access Road	1568 + 00 to 1551 + 50	Ra1	1,600
Total			**2,650**

Under the Massachusetts Wetlands Protection Act, Banks are presumed to be significant to public and private drinking water supply, pollution prevention, groundwater supply, flood control, storm damage prevention, protection of fisheries, and protection of wildlife habitat. The proposed project would alter Bank within the following segments of the Alignment: south of dog track access road (Raynham), Main Street (Easton), the Stoughton Fish and Game Club, and at locations where bridges and culverts must be replaced. Excluding the wetlands where bridges and culverts must be replaced, all of the wetlands where Bank would be altered are quite disturbed and Bank consists primarily of constructed drainage ditches. The following paragraphs examine each of these interests with respect to the project area wetlands.

- The wetlands in the vicinity of Main Street in Easton and the Stoughton Fish and Game Club are within Zone II Wellhead protection areas. While undisturbed wetlands within Zone II Wellhead protection areas are likely to be significant to the protection of water supplies, disturbed wetlands such as these are likely to provide only limited protection for the water quality of the wellhead protection area they occur within.

- Because ground water recharge may seasonally occur in portions of these wetland systems Banks presumed to be significant to ground water supply.

- The Bank that would be altered by this project generally occurs within disturbed areas, however, other than south of the dog track access road, they are generally well-vegetated and may protect water quality by reducing erosion and siltation. The bank south of the dog track access road has an unvegetated sand and gravel bed that is subject to erosion.

- Banks occurring within 100-year floodplain are likely to be significant in flood control and storm damage prevention. The wetlands located south of the dog track access road (Raynham), Main Street (Easton), the Stoughton Fish and Game Club are not within 100-year floodplain and, therefore, not likely to contribute to this interest.

- The wetlands located south of the dog track access road (Raynham), Main Street (Easton), the Stoughton Fish and Game Club do not border perennial water bodies and, therefore, not likely to be significant to fisheries. Banks bordering perennial water bodies, such as Black Brook, are likely to be significant to fisheries.

- The wetlands located south of the dog track access road (Raynham), Main Street (Easton), and at the Stoughton Fish and Game Club contain Bank that is generally disturbed and consists of constructed drainage ditches or railroad ballast. In addition, no permanent water occurs in these wetlands. Therefore, the bank occurring within these wetlands is not likely to provide important wildlife habitat.

Work Within Bordering Land Subject to Flooding

"Bordering Land Subject to Flooding is an area with low flat topography adjacent to and inundated by flood waters rising from creeks, rivers, streams, ponds, or lakes. It extends from the banks of these waterways and water bodies; where a bordering vegetated wetland occurs, it extends from said wetland" [310 CMR 10.57(2)(a). *"The boundary of Bordering Land Subject to Flooding is the estimated maximum lateral extent of flood water which will theoretically result from the* statistical *100-year frequency storm… determined by reference to the most recently available flood profile data prepared for the community within which the work is proposed… under the Federal Emergency Mapping Agency…"*
[310 CMR 10.57(2)(c)].

At several locations along the Stoughton Branch, FEMA mapping indicates that floodwaters overtop the existing railway bed during the 100-year storm event. Fiel inspection and available Flood Studies generally show that the railroad embankment is higher than the projected 100-year flood. The proposed project would result in impacts to Bordering Land Subject to Flooding where this resource area occurs within the railway bed. Because this resource area occurs within the railway bed, reconstruction of the railbed makes avoidance of the impacts to this resource area infeasible. In addition to the areas listed in Table 4.1-5, upgrade of the existing active freight track is proposed within an area mapped as 100-year floodplain of the Taunton and Little Rivers (between Dean Street and High Street, Taunton). However, the work proposed in these areas is a maintenance activity that will be confined to the existing track and will not affect flood storage or any natural area.

Table 4.1-5
Summary of Impacts to Bordering Land Subject to Flooding

Location	Approx. Station Location (feet)	Wetland	BLSF Impact (square feet)
Black Brook	1388 + 00	Ea31	19,600
Black Brook	1403 + 00	Ea32	2000
Between Carver St. and Rt. 138	1654 + 00	Ra7	2,560
Total			**24,160**

Under the Massachusetts Wetlands Protection Act, Bordering Land Subject to Flooding (BLSF) is presumed to be significant to flood control, storm damage prevention, and protection of wildlife habitat. The *Existing Conditions* section of this chapter describes where BLSF occurs within the study area. Under the Massachusetts Wetlands Protection Act, all BLSF within the 10-year floodplain, within 100 feet of Bank or BVW, or that contains vernal pool habitat, is considered significant to the protection of wildlife habitat. All Bordering Lands Subject to Flooding within the project area are within 100 feet of Bank or BVW and, therefore, likely significant to the protection of wildlife habitat unless these are railroad embankments or otherwise altered [310 CMR 10.57(1)(a)(3)].

Work Within Riverfront Area

Riverfront Area is *"the area of land between a [perennial] river's mean annual high-water line measured horizontally outward from the river and a parallel line located 200 feet away"* [310 CMR 10.58 (2)(a)3]. Therefore, Riverfront Area occurs at all locations where the Stoughton Alignment crosses a perennial watercourse, or is within 200 feet of a perennial watercourse running parallel to the right-of-way. However, in accordance with 310 CMR 10.58(6)(a), the proposed project is an exempt activity for maintenance of a publicly-owned rail line in existence before August 7, 1996, therefore, impacts to Riverfront Area are not discussed.

Work Within the Buffer Zone

As demonstrated in Section 4.1.1, the Stoughton Branch alignment is located within 100 feet of wetland resource areas (Bordering Vegetated Wetland, Bank, Land Under Water) for approximately 53 percent of its length. In many areas, particularly through the Hockomock Swamp and Pine Swamp, the former railroad was built on an embankment through the wetlands, which currently border the embankment on each side. In these cases, reconstruction of the railbed, installation of ties, track and signals, and train operations will occur within the regulatory jurisdictional "buffer zone" to wetlands, and may have indirect impacts to the ability of these resources to protect the significant interests (functions and values) of the wetland.

Indirect Wetland Impacts

Some of the project-area wetlands may experience indirect impacts from the proposed project. Indirect impacts to wetlands are associated with disturbance near a wetland that may lower the ability of the wetland to provide functions and values. Indirect impacts are likely to be higher in higher-quality wetlands where a large percentage of the wetland is filled, but indirect impacts do not necessarily involve wetlands that are directly impacted. To assess indirect wetland impacts, wetlands adjacent to the study area were assessed for based on overall size, proximity to a perennial body of water, structural diversity in vegetation, and lack of surrounding developed areas. Based on this assessment, the Hockomock and Pine Swamp wetlands are the most valuable wetlands along the project alignment with respect to their ability to provide wildlife habitat and support rare species or communities. Table 4.1-6 shows the wetlands adjacent to the railroad right-of-way that may experience indirect effects with respect to their ability to provide important wildlife habitat and rare species habitat.

Table 4.1-6
Indirect Wetland Impacts

Wetland	Approximate Stations (feet)	Important Wildlife Habitat	Rare Species
St1/St2	1038 + 50 to 1044 + 70		
St3	1062 + 50 to 1073 + 00		
St4	1075 + 00 to 1080 + 50		
St6	1095 + 50 to 1098 + 50		
St8	1114 + 00 to 1116 + 80	X	
St9	1126 + 00 to 1132 + 00	X	
Ea2	1156 + 00 to 1158 + 00		
Ea5/6	1161 + 50 to 1186 + 00	X	
Ea8	1192 + 00 to 1194 + 00		
Ea9	1192 + 00 to 1195 + 50		
Ea12	1228 + 00		
Ea15/16	1269 + 00 to 1274 + 00	X	
Ea18	1276 + 00 to 1278 + 20		
Ea19	1278 + 00 to 1282 + 00	X	
Ea20	1278 + 50 to 1280 + 20		
Ea21/22	1294 + 00 to 1299 + 00	X	
Ea23/24	1203 + 00 to 1314 + 00	X	
Ea25	1320 + 00 to 1322 + 50	X	
Ea26	1320 + 00 to 1322 + 20	X	
Ea27	1326 + 00 to 1331 + 80	X	
Ea28/29	1336 + 00 to 1342 + 00	X	
Ea32	1395 + 00 to 1303 + 80	X	
Ea33	1413 + 50 to 1415 + 50	X	
Ea34	1414 + 00 to 1415 + 00		
Ea35	1421 + 80 to 1432 + 00	X	
Ea37	1451 + 00 to 1544 + 00	X	X
Ra2	1567 + 50 to 1575 + 50	X	
Ra3	1602 + 00 to 1605 + 00	X	
Ra4	1634 + 00 to 1638 + 75	X	
Ra5	1645 + 50 to 1648 + 00		
Ra7	1648 + 75 to 1666 + 00	X	
Ra8	1688 + 80 to 1697 + 50	X	
Ra9	1688 + 80 to 1698 + 00	X	
Ra10	1710 + 00 to 1712 + 50		
Ra11	1710 + 00 to 1712 + 50	X	
Ra12	1713 + 50 to 1764 + 00	X	X
Ra13	1769 + 50 to 1774 + 00	X	
Ra14	1769 + 50 to 1772 + 20	X	
Ta2	1806 + 00 to 1807 + 20	X	
Ta4	1818 + 00 to 1824 + 00	X	
Ta6	1839 + 00 to 1858 + 80	X	
Ta7	1863 + 00 to 1866 + 00		

Twenty-nine of the 43 wetlands within the railroad right-of-way provide important wildlife habitat, and two wetlands (Hockomock and Pine Swamps) also provide rare species habitat (uniqueness) as a wetland function. Wetlands that are associated with vernal pools also have a higher wildlife habitat value.

Along the project alignment, indirect impacts are expected to decrease the ability of the wetland to provide important wildlife habitat in areas directly adjacent to the construction or operation of the railroad. Indirect effects to wetlands wildlife habitat may result from clearing vegetation adjacent to the right-of-way, and increased noise and physical vibration associated with train service. Increased edge effects from clearing (discussed in more detail in Section 4.3 - *Biodiversity)* may also occur in these areas. The primary result of the increased edge effect will be to push individuals sensitive to noise and disturbance further away from the right-of-way, potentially increasing inter- and intraspecific competition for resources. Researchers in northern Maine found that construction of an interstate highway had little impact on wildlife in an adjacent forest (Ferris 1977[2], Palman 1977[3]), but that changes in vegetation along the right-of-way do affect the structure of some wildlife communities 300 to 700 feet off the right-of-way. While the commuter rail will be much less traveled than a roadway, some mortality is expected. Populations whose individuals currently cross the right-of-way to access feeding or breeding sites can be expected to experience increased mortality rates. However, increased mortality has been shown to have no significant effects on populations that are stable and reproduce quickly (Hodson 1966[4], cited in Forman and Alexander 1998[5]).

4.1.2.2 Attleboro Bypass

As described in the ENF, the Attleboro Bypass would fill approximately 5.7 acres of BVW, and alter approximately 580 linear feet of Bank. This alternative would require some work in Land Under Water for two watercourse crossings. No impacts to BLSF are expected. The wetlands that would be filled to construct this alternative include wetlands within the Wading River wetlands system and one wetland associated with the Chartley Brook wetland system. No certified vernal pools occur within this alignment, and all wetlands that would be filled are within or adjacent to a maintained powerline-right-of-way or active rail line. There are no rare species habitats or priority sites in the vicinity of the Bypass.

The wetlands affected by the Attleboro Bypass are primarily forested and shrub swamp wetlands embedded in a forested upland matrix. The wetlands north of

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[2] Ferris, C.R., D.S. Palman and V.B. Richens. 1977. Ecological impact of Interstate 95 on birds and mammals in northern Maine. Report No. TP-77-21. Maine Department of Transportation, Augusta, ME.

[3] Palman, D.S. 1977. Ecological impact of Interstate 95 on small and medium-sized mammals in northern Maine. M.S. Thesis, University of Maine, Orono

[4] Hodson, 1966. A survey of road mortality in mammals (and including data for the grass snake and common frog). J. Zool, Lond. 148:576-79

[5] Forman, R.T.T. and L.E. Alexander. 1998. Roads and their major ecological effects. Annual Review of Ecological Systems. 29:207-31.

Route 123 border a tributary of the Wading River, while the wetlands south of Route 123 are associated with Chartley Pond. These southern wetlands are largely shrub swamp wetlands with pools of standing water, and occur in a more open landscape under the overhead transmission lines.

These wetlands are likely to be significant to the protection of surface and groundwater quality and quantity, prevention of pollution, and wildlife habitat. Wetlands at the northern end of the bypass (at the junction with the Northeast Corridor) are within mapped 100-year floodplain and also contribute to flood storage and floodflow desynchronization. Wetlands bordering Chartley Pond are also important to flood storage. All of the wetlands along the bypass provide important wildlife habitat due to their interspersion within an upland matrix, the diversity of plant community types, their connection to larger wetland systems, and the relative scarcity of wetland habitats within the immediate vicinity. The area is bordered to the west by the developed areas of Attleboro.

The Attleboro Bypass would result in the direct and indirect loss of wetlands and wetland functions. In addition to the direct loss of 5.7 acres of wetland, the raised railroad embankment would create a new barrier to wildlife movement within these wetlands, and between the wetlands and adjacent uplands. The construction of a new railroad embankment would also be likely to affect surface and groundwater flow and result in a change in hydrology of the upstream wetlands, which would alter vegetation and could affect their wildlife habitat functions.

4.1.2.3 Easton Station

No impacts to wetlands are expected from construction of this station because the station is proposed in an upland, partially disturbed site on the Easton/Raynham town line. The closest wetland, Whitman Brook, is approximately 150 feet west and 300 feet south of the station. The station will be constructed with the appropriate stormwater controls to avoid wetland impacts (see Section 4.2 – *Water Quality)*.

4.1.2.4 Raynham Station

At the Raynham Station, retaining walls will be used to maintain the toe of slope. Where wetlands occur near the toe-of-slope, sideslopes will be constructed at a 2:1 slope to minimize impacts. A footbridge will be constructed over a narrow area of BVW but no wetland loss is anticipated because no footings or piers will need to be placed in the wetland. The BVW is a small emergent marsh between a construction yard and the railroad berm and will not be affected by construction because no clearing will be required. Minor Bank impacts are expected from station construction near a ditched intermittent stream at the toe-of-slope between the dog track and the railroad berm.

4.1.2.5 Taunton (Dean Street) Station

This station is proposed approximately 300 feet north of Dean Street along Railroad Avenue. This station is proposed in a highly disturbed area that is currently occupied by a steel tanks manufacturers and a former manufacturer of rubber heels, soles, and tubing. Wetland Ta3 occurs approximately 150 feet north of the proposed station but the station will be constructed with the appropriate stormwater controls to avoid wetland impacts (see Section 4.2 – *Water Quality).*

4.1.2.6 Battleship Cove Station

No wetland impacts are expected from construction of this station because the station site is currently developed, and there are no wetlands in the immediate vicinity of the proposed station. A small ditched waterway occurs on the south side of the existing tracks, but the station will be constructed with the appropriate stormwater controls to avoid wetland impacts (see Section 4.2 – *Water Quality).*

4.1.2.7 Freetown Station

This station has been relocated from the site originally described in the ENF. This proposed site consists of an inactive gravel pit and has been extensively altered. No wetlands are within the proposed station site and therefore no wetland impacts are anticipated.

4.2.2.8 Other Areas

The New Bedford/Fall River Commuter Rail Extension will also require reconstruction and rehabilitation of tracks, signals and bridges south of Weir Junction, along the Attleboro Secondary, the New Bedford Main Line, and the Fall River Secondary. Portions of these lines, which currently carry a single track, will be double-tracked to allow safe and efficient operations of freight and commuter rail. All work will occur on the existing embankment used by the existing, active freight rail, and will not result in any work within wetland resource areas.

4.1.3 Mitigation Measures

This section describes the measures the proposed project will employ to mitigate impacts to study area wetlands. These measures include erosion and sedimentation controls designed to minimize impacts to wetlands from construction activities and compensatory wetland mitigation areas designed to provide replication for necessary wetland alteration from the proposed project.

4.1.3.1 Avoidance and Minimization

The Stoughton and Attleboro Alternatives have been designed to avoid wetlands to the extent practicable, and to minimize wetland impacts where avoidance is not feasible. Measures incorporated into the project design will minimize wetland impacts where impacts are unavoidable. Unavoidable impacts occur along the Attleboro Bypass, and along the Stoughton Branch where wetlands have developed within the former railroad right-of-way. This section describes specific measures to minimize or avoid impact in sensitive areas, as well as construction measures and erosion and sedimentation control measures that would be used throughout the project to minimize construction impacts.

Clearing

Along the project area, approximately 100 acres of land will be cleared to reconstruct the tracks. Clearing and grubbing equipment in the Hockomock and Pine Swamps will be restricted to the top of the berm and will be outside of wetland areas.

Bridge and Culvert Reconstruction

Short-term water quality impacts can from construction activities will be avoided and minimized by replacing all bridges and culverts during a period of low flow. The exposed soils generated from these activities within and upgradient from stream channel will be subject to erosion and sedimentation during construction activities. To avoid transporting sediments to wetlands and surface waters, dewatering basins will be set up in all areas where culverts and bridges are to be replaced to allow sediments time to settle prior to discharge. Bridge and culvert replacement will occur as quickly as possible to minimize the potential for sedimentation of the waterways.

Pine Swamp Track Reconstruction

In Pine Swamp, the railroad embankment is from 19 to 23 feet wide, and wetlands occur at the toe-of-slope. Several methods of construction were considered to avoid wetland impacts. Several options were evaluated raise the alignment the required maximum of 1.3 feet (including the depth of the tie, rail, and ballast) and avoid work in wetlands.

The selected option consists of a reinforced earth wall system. Reconstructing the embankment will be accomplished by using reinforced soil retained by precast concrete walls. Footings will not be necessary because the panel sections are only four to six feet high, allowing them to be set directly on the ground or on a bed of crushed stone. Eliminating the need for footings will avoid the need for dewatering, thereby reducing potential disruption to and sedimentation of the receiving waters. The panels, which are 5.5 inches thick and 10 feet long, can be placed using a crane from the top of the rail embankment. Heavy machinery in Pine Swamp will not access the site before timber mats have been placed along the railbed to protect the soil from compaction.

To ensure that new ballast remains outside of wetland resource areas within Pine Swamp and at other toe-of-slope wetlands, a subballast retainer will be placed along the alignment that will act as a shoulder to retain new ballast. Embankment and subballast will be placed prior to ballasting track.

Erosion and Sedimentation Control

Temporary and permanent erosion control measures will be implemented at along the toe-slope at of the railroad berm to prevent construction-related impacts to project area wetlands and waterways. Best Management Practices will be instituted to assure that erosion and sedimentation controls are operating correctly and to assure the success of the wetland resource protection.

Water quality impacts to surface waters at sites of culvert installation will be minimized through the use of appropriate construction techniques including siltation curtains, temporary coffer dams, or other devices to prevent discharge of sediments to surface waters. Construction activities near watercourses will be scheduled to avoid impacts to aquatic life spawning periods. Sedimentation controls will be installed before construction to ensure that no sediments are transported to the wetlands during construction or before permanent stabilization of all surfaces following construction. These controls will also serve as demarcation of the limit of work. Staked hay bales and woven polyethylene filter fabric fencing will be installed along the limit of grading and/or disturbance adjacent to wetlands and watercourses or on steep slopes above sensitive resource areas

Upon completion of grading, any exposed soils will be seeded with a wildlife/conservation grass mixture to provide permanent stabilization and erosion control. The seeded slopes will be temporarily mulched with loose hay to prevent erosion before the seeds germinate and take root.

4.1.3.2 Compensatory Wetland Mitigation

Suitable wetland mitigation sites are commonly upland areas that are disturbed under existing conditions, adjacent to wetlands, and in the vicinity of both the railway alignment and areas where wetland impact will occur. This assessment was conducted using aerial photos, NRCS soil surveys, and USGS topographic mapping. Site visits to visually confirm existing conditions along the Stoughton Branch were made during June and September 1998. The following sections describe the potential wetland mitigation areas for impacts to Bordering Vegetated Wetland for the Attleboro and Stoughton Alternatives. Compensatory mitigation for Bank and Bordering Land Subject to Flooding has not yet been identified.

Stoughton Alternative

Four compensatory wetland mitigation areas have been identified in the vicinity of wetland impacts (filling) along the Stoughton Alternative. Table 4.1-7 contains a summary of the potential wetland mitigation areas, and Figure 2.3-1 shows the approximate locations of the potential wetland mitigation areas.

Table 4.1-7
Potential Wetland Mitigation Areas

Replacement Area Number	Town	Potential Replacement Area Available (acres)
R1	Stoughton/Easton	0.5 to 1.0
R2	Easton	0.25 to 0.5
R3	Raynham	0.75 to 1.0
R4	Raynham	0.35 to 0.5
Total		**1.85 to 3.0**

Site R1 - Gravel pits west of Easton Motel and east of ROW (Stoughton/Easton)

This area is an old borrow pit east of the railroad right-of-way and north of a forested wetland. It is accessed from Route 138 and the Easton Motel parking lot. The area is partially vegetated by pioneer tree species (*e.g.*, white pine, gray birch, quaking aspen) or unvegetated in some locations. This area is immediately adjacent to an approximately 4-acre forested wetland. A portion of this site has been selected as the site of the proposed North Easton Station, however, there appears to be sufficient area to construct a replacement wetland area adjacent to the station. Wetland hydrologic conditions would be achieved by grading back from the edge of the adjacent wetland and constructing the replacement area at the same elevation as the adjacent wetland. This site could provide approximately 20,000 to 40,000 square feet (approximately 0.5 to 1 acre) of replacement wetland.

Site R2 - Gravel pits west of Town of Easton Well Site (Easton)

This area is a borrow pit east of the railroad right-of-way and north of a forested wetland, similar to the R1 site. Access to the site is from Gary Road. It is approximately 600 feet west of the Town of Easton Well Number 4088000-01G. The site is unvegetated and contains exposed sand and gravel. A large forested/shrub swamp, having a perennial watercourse that flows east to Morse Pond and Queset Brook, is immediately adjacent to and south of this site. Wetland hydrologic conditions would be achieved by grading back from the edge of the forested wetland and constructing the replacement area at the same elevation as the adjacent wetland. This site could potentially provide 10,000 to 20,000 square feet (approximately 0.25 to 0.5 acres) of replacement wetland.

Site R3 - Gravel pit 1,200 feet northwest of King Philip Street (Raynham)

This borrow pit is approximately 1,200 feet northwest of the King Philip Street crossing of the railroad right-of-way within the Town of Raynham. This site can be accessed from the railroad right-of-way north of King Philip Street. The site contains approximately 30,000 square feet (0.75 acres) of unvegetated sand and gravel. The remainder of the site is forested with white pines. The adjacent forested wetland contains an overstory of red maple and a thick shrub layer containing silky dogwood, highbush blueberry (*Vaccinium corymbosum*), arrowwood (*Viburnum dentatum*), and winterberry (*Ilex verticillata*). This area is bordered by forested wetland to the north and west, and the railroad right-of-way to the east. This site could potentially provide approximately 30,000 to 40,000 square feet (0.75 to 1 acre) of replacement wetland.

Site R4 - North of auto salvage yard on East Britannia Street, south of Pine Swamp (Raynham)

This site is approximately 400 feet northeast of the East Britannia Street crossing of the railroad right-of-way, adjacent to the north side of Rose's Used Auto Parts. The site can be accessed from the salvage yard or the railroad right-of-way. This site is vegetated with scrub oak (*Quercus ilicifolia*), gray birch (*Betula populifolia*), white pine and bracken fern (*Pteridium aquilinum*). The adjacent wetland (Pine Swamp) contains forested and scrub/shrub cover types. Wetland hydrology would be achieved by grading back from the edge of the wetland and constructing the replacement area at the same elevation as the existing wetland. This site could potentially provide approximately 15,000 to 20,000 square feet (0.35 to 0.5 acres) of replacement wetland.

Although Rose's Used Auto Parts was noted as a potential hazardous materials environmental concern, there was no evidence of stained soil or stressed vegetation observed near the railroad right-of-way. In addition, the property was not listed on the database search that was conducted for the project. This site, however, would need to be scrutinized more closely for potential contamination before a wetland replacement plan for this site is developed.

Attleboro Alternative

One site adjacent to the Wading River wetlands system, and one site adjacent to the Chartley Brook wetlands system were identified to mitigate for wetland impacts from construction of the Attleboro Bypass (Figure 2.3-4). Both of the potential replacement wetlands consists of upland forest, with shrubby areas within the right-of-way. The vegetation for the two potential replacement sites is described below. Uplands along the project alignment are similar for both of the replacement areas and are described in the following paragraphs.

Much of the area of the proposed Attleboro Bypass is forested. These forests are generally dominated by young second-growth deciduous and mixed deciduous-coniferous communities in which various oaks (*Quercus* spp.), white pine (*Pinus strobus*), and red maple (*Acer rubrum*) are the dominant species in the forest canopy. Common species in the shrub and herb layers of the forests include witch-hazel

(*Hamamelis virginiana*), lowbush blueberry (*Vaccinium angustifolium*), arrowwood (*Viburnum dentatum*), bracken fern (*Pteridium aquilinum*), and Canada mayflower (*Maianthemum canadense*).

Shrub habitats in the vicinity of the proposed Attleboro Bypass are provided by the powerline right-of-way. Upland shrub communities dominate much of the powerline right-of-way. Species such as scrub oak (*Quercus ilicifolia*), sweetfern (*Comptonia peregrina*), lowbush blueberry, sassafras (*Sassafras albidum*), little bluestem (*Schizachyrium scoparium*) and various goldenrods (*Solidago* spp.) grow in the dry, sandy soils that occur throughout much of the cleared powerline right-of-way.

Site R1

This site is approximately 800 feet south of Richardson Avenue and adjacent to the powerline right-of-way. The site can be accessed from the right-of-way. This site could potentially provide 8 acres of replacement wetland within the Wading River wetland system.

Site R2

This potential replacement area is approximately 850 feet north of Chartley Brook, and can be accessed via the powerline right-of-way. This potential replacement area is nearly completely surrounded by wetlands and could provide up to 12 acres of wetland adjacent to the Chartley Brook wetlands system.

4.1.4 Regulatory Compliance

Extension of commuter rail service to New Bedford and Fall River will require regulatory review with respect to state and federal wetlands regulatory programs, as described below.

4.1.4.1 Massachusetts Wetlands Protection Act

The Massachusetts Wetlands Protection Act regulations establish performance standards for work proposed within each of the resource areas, and requires review of any work proposed within 100 feet of a wetland resource to determine if that work will result in the alteration of the wetland. "Alteration" is defined to include a change in vegetation, hydrology, or water quality of the wetland.

Construction of either the Stoughton or Attleboro Alternatives will require the Commissioner of DEP to issue a variance from the Wetlands Protection Act regulations, as either alternative will result in the loss of more than 5,000 square feet of Bordering Vegetated Wetland and therefore would not meet the performance standard for this resource.

WPA regulations, at 310 CMR 10.05(10), allow a request for a variance to be submitted to the DEP directly for projects that will result in work and wetlands alteration in more than one municipality. This is intended to provide a uniform review and uniform conditions for linear transportation projects. The MBTA intends to prepare and file a variance request with the DEP following the selection of a preferred alternative. WPA regulations require that Notices of Intent be filed with each of the affected municipalities after the Commissioner issues a Variance, so that the municipalities can issue Orders of Conditions for the proposed work. The MBTA would file a Notice of Intent with each of the affected towns following the issuance of a Variance. Chapter 5 of this DEIR provides a draft Variance Request that addresses the requirements of the variance process.

4.1.4.2 Water Quality Certification (Section 401 of the Clean Water Act)

The Massachusetts DEP department of water pollution control is required to issue water quality certifications for projects that result in discharge or fill, pursuant to the Massachusetts Clean Waters Act (M.G.L. c. 21 §§ 26 – 53). There are seven criteria for the evaluation of applications for discharge of dredge or fill material (314 CMR 9.06), and the project's compliance with the criteria is presented below.

No discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem.

This document contains an analysis of alternatives (Chapter 3). The Stoughton Alignment is the preferred alternative in part because it has less adverse impact to the aquatic ecosystem (wetlands) than does the Attleboro alternative.

No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken which will minimize potential adverse impacts to the bordering or isolated vegetated wetlands or land under water, including a minimum of 1:1 restoration or replication of isolated or bordering vegetated wetlands.

Wetland impacts will be minimized and do include replication as described in Section 4.1.3

No discharge of dredged or fill material shall be permitted to ORWs, except for the activities specified in 314 CMR 9.06(3)(a) through (I), which remain subject to an alternatives analysis and other requirements of 314 CMR 9.06.

The proposed project not fill ORWs excepted as specified in 314 CMR 9.06 (3) (c) "Maintenance, repair, replacement, or reconstruction but not substantial enlargement of existing and lawfully located structures or facilities including buildings, roads, railways, utilities, and coastal engineering structures."

Discharge of dredged or fill material to an ORW specifically identified in 314 CMR 4.06(1)(d) (e.g., vernal pools, within 400 feet of a water supply reservoir and any other area so designated) is prohibited as provided therein unless a variance is obtained under 314 CMR 9.08.

No dredge or fill material will occur to the above specified areas.

No discharge of dredged or fill material is permitted for the impoundment or detention of stormwater for the purposes of controlling sedimentation or other pollutant attenuation.

No dredging or fill is planned in conjunction with the construction of the stormwater management systems proposed as part of this project.

Stormwater discharges shall be provided with BMPs to attenuate pollutants and provide a set back from receiving water or wetland.

The proposed stormwater management systems at the stations include BMPs and setbacks as part of compliance with the DEP/CZM stormwater management policy (See Section 4.2.4.3 of this Draft EIR).

No discharge of dredged or fill material shall be permitted in the rare circumstances where the activity meet the criteria for evaluation but will result in substantial adverse impacts to the physical, chemical, or biological integrity of surface waters of the Commonwealth.

The proposed project will not result in substantial adverse impacts to the surface waters of the Commonwealth.

4.1.4.3 Department of the Army Permit (Section 404 of the Clean Water Act)

Section 404 of the Clean Water Act regulates the discharge of dredged or fill material into "Waters of the United States", which include vegetated wetlands and land under a water body. The New Bedford/Fall River Commuter Rail project would require the issuance of an Individual Section 404 Permit (i.e., would not be eligible for the Massachusetts Programmatic General Permit) because it would result in the loss of more than 1 acre of vegetated wetland.

The proposed project will require a Section 10/Section 404 permit for the placement of fill in freshwater wetlands. The wetland filling is evaluated using the United States Environmental Protection Agency (EPA) Section 404(b)(1) guidelines.

The Section 404(b)(1) guidelines are designed to avoid unnecessary filling of waters and wetlands. For the guidelines to be satisfied:

- there must be no practicable alternatives available which would have less adverse impact on the aquatic ecosystem and which do not have other significant adverse environmental consequences;
- the activity must not violate federal or state water quality standards or threaten an endangered species;
- there must not be significant degradation of waters and wetlands; and
- all reasonable steps must be taken to minimize adverse effects to the aquatic environment.

The following sections discuss how the proposed commuter rail complies with the Section 404 (b)(1) guidelines.

Practicable Alternatives

Several alternatives were considered for providing commuter rail service to the cities of Fall River and New Bedford. The process of evaluating these alternatives considered impacts to environmental resources and impacts to businesses and residences adjacent to the proposed rail. Chapter 3 - *Alternatives* discusses in detail the alternatives considered, their practicability, and selection of the Preferred Alternative. As demonstrated in Chapter 3 - *Alternatives*, besides the Preferred Alternative, there are no practicable alternatives available which would have less adverse impact on the aquatic ecosystems and which do not have other significant adverse environmental consequences.

Water Quality/Threatened and Endangered Species

The proposed project will include Best Management Practices employed by a proposed stormwater management system that will mitigate potential impacts to water quality by controlling runoff velocities and removing pollutants from the stormwater runoff discharging from station locations to downstream surface water resources. As discussed in Section 4.2 - *Water Quality*, the proposed project will comply with the Massachusetts Stormwater Management Standards.

The proposed project will not affect any federally-listed endangered species, because there are none within the project area. Estimated habitat for six state-listed species occurs within or immediately adjacent to the project corridor Section 4.3 - *Biodiversity* examines project impacts to rare species habitat from the proposed commuter rail, and describes mitigation measures to avoid and minimize any short-term or long-term adverse effects on rare species habitat.

Significant Degradation of Waters and Wetlands

Avoidance of all direct wetland impacts would only be possible by implementing the No-Build Alternative. Based on the distribution of wetlands within the project area and the presence of wetlands within the railway bed, direct wetland impacts to resource areas are unavoidable. Minimizing wetland impacts was a primary concern throughout the planning process and is discussed above. Efforts to minimize impacts to wetlands and to mitigate impacts to wetland areas through the construction of wetland replacement areas have been undertaken so that there will be no significant degradation of waters and wetlands as a result of construction of the proposed project.

4.1.5 Summary

The proposed project will have direct and indirect effects on wetlands in the project area. The Stoughton Alignment will result in less wetland fill than the Attleboro Alternative, and the filled wetlands are primarily wetlands that have been created in the railway bed from blocked drainage. Table 4.1-8 compares impacts from the two alternatives.

Table 4.1-8
Summary of Direct Impacts From the Stoughton and Attleboro Alternatives

	Stoughton	Attleboro
Bordering Vegetated Wetland	2.5 acres	5.7 acres
Bank	2,650 linear feet	580 linear feet
Bordering Land Subject to Flooding	0.56 acres	0
Mitigation	3 acres	20 acres available

Indirect effects to wetlands will be less under the Stoughton Alternative because the majority of the affected wetlands are not high-quality wetlands, particularly in comparison to the wetlands affected by the Attleboro Alternative. As mentioned above, every effort to avoid and minimize wetland impacts has been taken during the design process, and there will be no loss of wetland in either of the two most valuable wetland systems, Hockomock and Pine Swamps.

Either alternative would also require construction within the buffer zone to wetlands south of Weir Junction for reconstruction of the existing rail system and, in places, the addition of a second track. The East Taunton Commuter Rail Station would also be constructed within the buffer zone of bordering vegetated wetlands. This work would not result in direct impacts to regulated wetland resource areas.

4.1.5.1 Stoughton Alternative

Wetland fill will occur within Bordering Vegetated Wetland in 12 wetlands in 5 locations under this alternative, totaling approximately 2.46 acres of fill. Minor sliver impacts may occur in 4 other wetlands (Wetlands St1/2, St3, St4, and Ra12) but these impacts would total less than 0.05 acres. As the project design progresses it may be possible to avoid filling these wetlands, therefore, they are not considered in the quantification of wetland loss. Wetlands Ra13, Ra14, Ra15, Ra16, Ra17, and Ta1 (between East Brittania Street and Winter Street) are part of a larger wetland system and comprise approximately 0.96 acres of the total fill. Because of their connection to larger wetlands in the project area, these wetlands are most likely more valuable in terms of the functions and values they provide (see Table 4.1-1). The remaining 1.5 acres of fill will occur in areas along the railbed that have become wetlands from blocked drainage (Wetlands St6, St7, Ea13, Ea14, and Ra1), or are not connected to a larger wetland system Ea28).

Indirect impacts from this alternative may affect wildlife habitat and the uniqueness values of the wetlands. The most likely effect on wildlife would be to push the edge further from the right-of-way during construction and once train service resumes. However, most wildlife will not be affected to a substantial degree due to the very large size of these wetlands, which will allow them to continue to provide important wildlife habitat and support wildlife populations. Indirect effects to unique wetlands may occur because the Hockomock and Pine Swamps contain six rare species in the vicinity of the proposed alignment.

4.1.5.2 Attleboro Alternative

Approximately 5.7 acres of wetland would need to be filled to construct the Attleboro Bypass. These wetland impacts would occur in the Chartley Brook and the Wading River systems, both of which are relatively undisturbed systems. However, all other direct impacts are lower because the track distance is shorter (14 miles vs. 2.5 miles), and fewer watercourses require crossings. Although impacts from wetland fill are substantially higher under this alternative, the potential mitigation adjacent to the affected wetland systems is much greater than with the Stoughton Alternative. In addition, the Attleboro Bypass avoids any impacts to rare species habitats because none occur within the project area.

Indirect impacts to wildlife habitat will be substantial because the Bypass alignment bisects wetland systems and will therefore interrupt movement corridors and alter wetland hydrology and vegetation, whereas many of the wetlands along the Stoughton Branch are already separated by the existing berm and connected by existing culverts.

4.2 Water Quality and Water Supply

Surface and ground water are important natural resources which have a variety of uses including public drinking water, irrigation, industrial, and as habitat for wildlife. Water quality is determined by the amount of dissolved or suspended material that water may contain. The water quality of surface water and ground water is influenced by surficial geology, land use, and water quality of source waters. The use of water may be limited by its physical and chemical characteristics.

This section will describe the existing conditions of water quality and water supply along the Stoughton Branch, discuss the possible impacts of the proposed commuter rail extension and present mitigation measures which would reduce the impacts on water quality.

4.2.1 Existing Conditions

The surface water and ground water resources in the vicinity of the Stoughton Branch are described below, and are shown on Figure 2.3-2.

4.2.1.1 Surface Water

Surface water occurs near the Stoughton Branch as streams and ponds. The ponds are relatively small and often associated with streams. Table 4.2-1 presents a list of named surface waters in the proximity of the Stoughton Branch. The Stoughton Branch is contained within the Taunton River drainage basin.

None of the surface water adjacent to the Stoughton Branch is used as drinking water. The Stoughton Branch does not contain lands within the watershed of a surface drinking water source. The Massachusetts Drinking Water Regulations [310 CMR 22.00] specify three surface water protection zones, A, B, and C. Zone A includes the Class A surface water, land within 400 feet of the Class A surface water, and land within 200 feet of the tributaries of the Class A water. Zone B is the area within one-half mile of the Class A surface water, or no less than Zone A or no greater than Zone C. Zone C is the watershed of the surface water source that is not designated Zone A or Zone B. The surface water protection zones are shown on Figure 2.3-2, however the Stoughton Branch does not occur in any Zone A, B, or C areas.

Most of the surface water bodies near the Stoughton Branch are rated as Class B waters. These waterbodies are designated as habitat for fish, other aquatic life, and wildlife, and for primary and secondary recreation. The Taunton River is tidally influenced in the project area and is designated as a Class SB waterway. Class SB waters are also designated as fish, aquatic life, and wildlife habitat and for primary and secondary contact recreation.

Table 4.2-1
Surface Water Bodies near the Stoughton Branch

Name	Town	Distance from Branch (feet)	Outstanding Resource Water
Brittons Pond	Stoughton	2,500	No
Woods Pond	Stoughton	2,000	No
Ames Pond	Stoughton	5,000	No
Long Pond	Stoughton, Easton	3,500	No
Whitman Brook	Stoughton, Easton	crossing	No
French Pond	Easton	4,000	No
Picker Pond	Easton	2,400	No
Shovelshop Pond	Easton	300	No
Longwater Pond	Easton	1,500	No
Queset Brook	Easton	crossing	No
Morse Pond	Easton	400	No
Dean Pond	Easton	4,600	No
Black Brook	Easton	crossing	Yes
Lake Sabbatia	Taunton	6,700	No
Black Pond	Taunton	5,000	No
Prospect Hill Pond	Taunton	4,000	No
Kings Pond	Raynham	4,100	No
Taunton River	Taunton	crossing	No
Mill River	Taunton	crossing	No

Source: USGS Norwood, Brockton, and Taunton Quadrangles

The surface waters of the Hockomock Swamp Area of Critical Environmental Concern (ACEC) are Outstanding Resource Waters (ORWs) pursuant to the Massachusetts Surface Water Quality Standards (314 CMR 4.04). Black Brook in Easton is designated as a waterbody included in the ACEC. Whitman Brook, Queset Brook, Shovelshop Pond, Picker Pond, Longwater Pond, and Morse Pond are all tributary to an ORW because they flow to Cowesset Brook, which is included in the ACEC. New or increased discharges to an ORW are prohibited unless they are for the express purpose and intent of maintaining or enhancing the resource for its designated use or a variance is granted [310 CMR 4.04 (3) (b)].

4.2.1.2 Ground Water

The Towns of Stoughton, Easton, and Raynham currently use ground water as the source of municipal drinking water. Ground water resource areas are defined and regulated pursuant to the Massachusetts Drinking Water Regulations. The ground water supply protection areas [310 CMR 22.21] are shown on Figure 2.3-2 and described as follows:

- Zone I The protective radius required around a public water supply well or wellfield. This radius varies in size from 400 feet to 100 feet based on the approved yield of the well.
- Zone II The area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated.
- Zone III The area beyond Zone II from which surface water and groundwater drain into the Zone II.
- Interim Wellhead Protection Area (IWPA) The area within a half mile radius of a well that lacks a department approved Zone II.

The Ground Water Supply Protection regulations require that Zone I areas be "owned or controlled by the supplier of water." [310 CMR 22.21 (1)(b) 4]. Zoning controls are required to restrict land use within Zone II and Zone III. Track, trains, and parking areas are not prohibited uses in Zone II and Zone III areas.

The Stoughton Branch will cross Zone II areas in the Towns of Stoughton, Easton, and Raynham (Table 4.2-2). The Stoughton Branch does not cross areas designated as Sole Source Aquifers.

Stoughton

The existing Stoughton Branch crosses an IWPA as the track enters Stoughton. The Stoughton Branch crosses two abutting Zone II areas in central Stoughton. The northern Zone II contains three proposed wells that are between 700 and 1,575 feet from the track. The southern Zone II is for an existing community well that is approximately 3,375 feet from the track. The Stoughton Branch enters a Zone II area for wells located in the Town of Easton just north of the Stoughton/Easton town line.

Easton

The Stoughton Branch is within the Zone II area of three wells in Easton. These wells are community wells located between 500 and 2,275 feet from the track. The Zone II of these wells includes much of the drainage area of Whitman Brook, which the track crosses. The proposed North Easton station is also in the Zone II of these wells. A Town of Easton Aquifer protection zone occurs in the existing Zone II area and in southeastern Easton. Three wells of the Simpson Springs Corporation are approximately 3,000 feet from the track and are Transient non-community water system (TNC) wells. TNCs are public water systems that are non-community water systems that serve water to 25 different persons at least 60 days a year.

Table 4.2-2
Public Water Supply Wells near the Stoughton Branch

Well name	Location	Rating (GPM)	Well Type	Distance from Branch (feet)
CI-2	Washington St., Stoughton	>70	Proposed	1,575
CI-1	Washington St., Stoughton	>70	Proposed	960
22-92	Washington St., Stoughton	>70	Proposed	700
Goddard Well	Goddard Hospital, Stoughton	>70	Community	3,375
GP well 2	Washington St., Easton	>70	Community	2,275
GP well 4	Washington St., Easton	>70	Community	1,700
GP well 1	Gary Lane, Easton	>70	Community	480
Simpson Spring Corp. (3 wells)	Washington St., Easton	>70	TNC	3,000
King Phillip Well # 2	King Phillip Street, Raynham	>70	Community	3,000
King Phillip Well # 1	King Phillip Street, Raynham	>70	Community	2,200
First St. Well	First Street, Raynham	>70	Community	700
King Phillip Well # 3	King Phillip Street, Raynham	>70	Proposed	2,500

Source: MassGIS Key: TNC = Transient non-community water system, GPM = Gallons per minute

Raynham

The Stoughton Branch crosses two Zone II areas in west-central Raynham. The western Zone II includes three existing community wells that are between 700 and 3,000 feet from the track. The eastern Zone II contains a proposed community well that is 2,500 feet from the track.

Taunton

The City of Taunton's public water supply is derived from surface water. The Stoughton Branch does not enter surface water or ground water protection areas in Taunton.

4.2.2 Impacts

Impacts from the Stoughton Branch will include direct, short-term impacts resulting from the reconstruction of the track and construction of stations. Indirect and long-term impacts may result from stormwater runoff at the stations and the operation and maintenance of the commuter rail.

4.2.2.1 Construction

The construction of the Stoughton Alternative, including the Stoughton Branch and reconstruction of the railroad infrastructure south of Weir Junction on the New Bedford Main Line and Fall River Secondary will require the restoration of track, bridges and culverts. Construction may result in short-term impacts to either surface water or ground water. Construction impacts to may result from erosion of exposed sediments during construction or the spilling of hazardous materials.

The erosion of sediments into surface waters can impact the aquatic ecosystem. Increases in sediment to surface waters can reduce the productivity of aquatic plants, and algae. Suspended solids can harm aquatic organisms that rely on filter feeding or gills for breathing. Rapid sedimentation can harm benthic organisms and alter the habitat provided by a surface waterbody. Construction related impacts to water quality will be minimized or avoided by using erosion control BMPs.

The accidental release of hazardous materials can impact both surface water and ground water. Construction will utilize a spill prevention plan to protect against spills particularly in sensitive areas.

4.2.2.2 Operations and Maintenance

Control of vegetation in the track is required because vegetation can interfere with train operation. Herbicides are the only effective means to control vegetation in the track ballast. Herbicide use could result in impacts to surface water and ground water unless carefully used and controlled. Herbicide in surface waters may impact the aquatic vascular plants and algae present altering food availability. Herbicides in surface or ground waters that are consumed by humans may cause health impacts.

The control of vegetation will conform to the Rights-of-Way Management Regulations, 333 CMR 11.00. These regulations require a 5 year Vegetation Management Plan (VMP) and a Yearly Operational Plan (YOP) which must be approved by the Department of Food and Agriculture. The YOP is made available for public review and comment as part of its approval by DFA and includes date and locations of herbicide application as well as spraying techniques and rates. The herbicides used must be selected from a list for sensitive area prepared by the DEP and DFA. Spraying of herbicide is not allowed within 10 feet of any wetland, watercourse, or waterbody, within 400 feet of any municipal well, or within 50 feet of any private well. Zone II areas may only be sprayed once every two years. Shoulder clearing is achieved by a combination of mechanical clearing and herbicide application and is made when vegetation interferes with safe operations.

Potential operational impacts of the train on surface water and ground water quality may include spills and aerial deposition of air pollution. The impacts of train operation on air quality are presented in section 4.6.

4.2.2.3 Stations

Commuter rail stations will consist of a platform to allow access to the train, a commuter parking area, and a drop off area. Station construction may cause short-term water quality impacts as described in section 4.2.2.1. Stations may also result in long-term impacts including impacts to water quality and a reduction of infiltration.

The creation of the commuter parking lot results in an impervious surface, which increases stormwater runoff. Stormwater runoff quality may be impacted by pollutants from the cars in the parking lot. Pollutants such as metals, oil, and grease can enter stormwater runoff as precipitation flows over cars and the parking lot surface. Pollutants may enter surface waters if the untreated stormwater runoff is routed to surface water. Increased impervious surface may also decreases infiltration of precipitation to groundwater. Station construction may impact groundwater by reducing infiltration volumes, or allowing pollutants to infiltrate to ground water.

North Easton

The proposed North Easton station is on the west side of the Stoughton Branch at the Stoughton/Easton boundary. The vegetation includes second growth upland forest and disturbed/cleared areas. The Bristol County Soil Survey, Northern Part (USDA-SCS, 1978) and Soil Survey of Norfolk and Suffolk Counties (USDA-SCS, 1989) identify the site soils as Merrimac fine sandy loam and Hinckley sandy loam, both soils are classified as Hydrologic Group A meaning they are well drained. Whitman's Brook flows roughly parallel to the tracks approximately 140 feet west of the tracks. The North Easton station is in the Zone II of community wells of the Town of Easton. The North Easton station may impact groundwater supply by reducing recharge volume within the well recharge area. Untreated stormwater infiltrating to the groundwater could impact the water quality of the ground water of this Zone II area. Stormwater runoff will not directly discharge into surface water or wetlands at the North Easton Station.

Raynham

The proposed Raynham Station is adjacent to the Raynham-Taunton Greyhound Park. The station is in the disturbed area of the dog track, currently used to store construction equipment and creosote-treated utility poles. The soils at the station site are classified as urban land (Bristol County Soil Survey, Northern Part USDA-SCS, 1978); and the station is not in a regulated groundwater protection zone. The Hockomock Swamp ACEC is immediately north of the proposed station. New or increased discharges of stormwater from this station will not be allow to be discharged to wetlands or surface waters of the ACEC, if stormwater discharges did occur from the station to the ACEC surface water could be impacted.

Dean Street Station (Taunton)

The proposed Dean Street Station is at the site of the former New Jersey Rubber Company complex. The site includes industrial buildings and pavement. The Soil Survey of Bristol County, Northern Part (USDA-SCS, 1978) maps the soil at the station site as urban land; the site is not within a regulated ground water protection zone. A stream and wetland complex occurs north and west of the site. The proposed station could impact the surface water adjacent to the site through releases of stormwater runoff.

Freetown

The Freetown station has been relocated since the filing of the ENF. The proposed Freetown Station is sited at a gravel pit operation off of Ridge Hill Road. The soils at the site include Pits-Udorthents complex, Urban land and Merrimac fine sandy loam as mapped by the Soil Survey of Bristol County, Southern Part (USDA-SCS, 1981) and will vary in their drainage characteristics. Two Transient non-community wells are located near the junction of Route 24, Route 79, and Ridgehill Road, however the station is not within the IWPA of those wells. The proposed Freetown Station will not discharge stormwater to surface water or wetlands.

Other Stations

Water quality effects of construction of the proposed East Taunton, Fall River, and New Bedford commuter rail stations were documented in the ENF. The East Taunton station will be designed inconformance with the Massachusetts Stormwater Policy, and will provide stormwater quality and quantity management prior to discharge of stormwater to adjacent wetlands. This station is not located within any groundwater or surface drinking water supply protection areas. The Fall River and New Bedford stations are located in developed, urban areas. These stations will be designed to improve the quality of stormwater runoff.

4.2.3 Mitigation

Mitigation measures employed will allow for a reduction in impacts to water quality by the Stoughton Branch. Mitigation measures address both short-term and long-term impacts by good construction practices and site design.

4.2.3.1 Erosion and Sedimentation Control

Erosion and sedimentation control measures are need for compliance with the DEP/CZM stormwater management policy and the U.S. Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) general permit for stormwater discharge from construction activity. The goal of erosion and sedimentation control is to reduce the amount of pollutants in stormwater by removing suspended material from stormwater runoff and reducing runoff velocity to reduce erosion.

Erosion and Sedimentation control Best Management Practices (BMPs) can mitigate the short-term impacts of construction related disturbance on water quality. Erosion and sedimentation controls will be used where earth will be disturbed or stockpiled upgradient of a wetland or waterbody. Erosion controls will include a haybale and siltfence barrier that will consist of a row of entrenched staked haybales placed over a flap of silt fence. The silt fence will be staked and will be placed on the downgradient side of the haybales. Following completion of construction, exposed areas will be stabilized and silt fence will be removed.

The mitigation of construction related impacts by erosion and sedimentation control may also include; temporary seeding, haybale checkdams, and rock outlet protection. These BMPs aid in the reduction of erosion by stabilizing exposed soil surfaces and reducing flow velocities. Bridge reconstruction work may temporarily require work in Land Under Water. Disturbance of sediment in the water will be limited by the installation of turbidity curtain or sheet sheeting as required by the bridge reconstruction.

4.2.3.2 Spill Prevention and Control

The construction contractor will implement a Spill Control Program in compliance with the Massachusetts Contingency Plan (310 CMR 40.00) and MBTA policy. The following practices will employed on site to prevent, reduce, and clean up spills.

- All spills will be reported to the authority and will be reported to appropriate state and/or federal agency if the reportable quantity is exceeded.
- Spill clean up material will be kept in chemical storage onsite.
- All spills will be cleaned up immediately after discovery.
- A spill report will be prepared after each occurrence.
- An appropriately trained site employee involved in day-to-day operations will be identified to be the spill prevention coordinator. Each employee will be

instructed to report spills to the spill prevention coordinator.

- An inventory of materials on site will be maintained as part of the Storm Water Pollution Prevention Plan (SWPPP) for the site.

Proper maintenance of the trains and tracks will reduce the chance of accidental release from trains and allow for them to operate efficiently once the operation of trains begins.

4.2.3.3 Vegetation Management

Vegetation Management of the Stoughton Branch will conform with the MBTA's Vegetation Management Plan, filed with the DFA in compliance with the Rights-of-Way Management Regulations (333 CMR 11.00). This plan includes a description of vegetation management techniques and the methods used to identify areas of restricted spraying.

The application of herbicide on the track ballast will occur with a truck equipped with roller wheels to allow the vehicle to safely travel on the tracks. The driver of the vehicle can operate the spray boom from the cab of the truck; the spray boom is equipped with a drip tray to protect against herbicide leakage when spraying is not occurring. Maintenance of vegetation along the edge of the Right-of-Way is performed with hand held tools when possible. Foliar and stump herbicide treatment outside of the ballast will target specific species and will be weather dependent.

Sensitive areas along the Stoughton Branch will be marked to allow for identification by the applicator. Areas to be marked include Zone IIs, Zone Is, and land within 100 feet of a private drinking water well, surface waters, wetlands, agricultural land, or inhabited area. These areas have restrictions on herbicide use pursuant to 333 CMR 11.04 (2) (c) (3). Chemical vegetation control can not be used within 10 feet of wetland or surface water thus; the majority of the track in Hockomock and Pine Swamp, and in other sensitive areas such as the Acushnet Cedar Swamp State Reservation will not be treated with herbicide. The identification and marking of sensitive areas along the Stoughton Branch will allow for control of herbicide application near surface water and ground water resource areas.

4.2.3.4 Stormwater Management

Track ballast is comprised of crushed stone. The track may consist of concrete ties and steel rails for the majority of the track. Treated timber ties may be used in populated areas, such as downtown North Easton, to reduce noise impacts. The track will not result in new point source stormwater discharges. The track material does not contain pollutants and will not release pollutants to surface water or groundwater. The track is designed to allow for rapid drainage of water from the tracks through the ballast, thus the track does not increase runoff rates or reduce infiltration volumes to ground water.

The proposed stations will result in new areas of impervious surface. The station sites will conform to the DEP/CZM Stormwater Management Standards by the use of BMPs, which are described later in this section. Compliance with the Stormwater Management Standards requires the preparation of a stormwater management operations and maintenance plan. This plan will be prepared for each station and will outline the standard operating procedures for snow removal, pavement sweeping, and maintenance of stormwater management structures. The on site treatment of stormwater in the stormwater management system will allow for a reduction of impact to surface waters downgradient of station sites. Station site stormwater management design will also include infiltration of treated stormwater to maintain existing levels of groundwater recharge.

North Easton

The North Easton Station contains approximately 11 acres of new impervious surface. The stormwater management system will be designed to collect, treat, and infiltrate stormwater or discharge stormwater from the parking area. Runoff from the station platform will be allowed to drain by sheet flow to the ballast on either side of the platform. Stormwater runoff from the access road, pick up/drop off area, and parking lot will be routed to catch basins equipped with deep sumps and hoods to aid in the removal of suspended solids and floating contaminants. The catchbasins will be connected by drainlines and will discharge to either vegetated swales or basins. Drainline discharges will be protected with rip rap to prevent erosion and reduce flow velocities. Basins and swales will be equipped with sediment forebays or stilling basins to increase the removal of suspended solids.

Retention and infiltration will be critical to the design of the North Easton station since the existing site is undeveloped, has soils that infiltrate well, and is within a Zone II groundwater protection zone. Retention of stormwater will likely occur north and east of the proposed station and must allow for discharge rates to approximate the existing conditions. Infiltration of treated stormwater will be necessary to mitigate impacts to ground water; recharge volumes will need to approximate existing site conditions to ensure that ground water volumes are not impacted. Detention and infiltration will occur in a constructed basin that may be an infiltration basin or wet pond. Pretreatment of stormwater will also include pavement sweeping to aid in the removal of pollutants before they enter stormwater runoff. Discharge from the North Easton station will not occur directly into a surface water or wetland; stormwater management will mitigate impacts to surface water downgradient of the North Easton Station.

Raynham

The Raynham station will not create new impervious surface. The design of the station's stormwater management system will meet the stormwater management policy guidelines. The Raynham station will be sited in a disturbed paved area adjacent to the Raynham-Taunton Greyhound Park and the Hockomock Swamp ACEC. This area currently is provided with no stormwater management or treatment mitigation measures. The stormwater runoff from the parking area will be routed to catch basins equipped with deep sumps and hoods. The catchbasins will be connected by drainlines and will discharge to either vegetated swales or basins. Drainline discharges will be protected with rip rap to prevent erosion and reduce flow velocities. Basins and swales will be equipped with sediment forebays or stilling basins to increase the removal of suspended solids. The area north of the station will likely be the site of a detention structure. The drainage and treatment of the access road will be determined in relation to the existing impervious surface of the dog track. The stormwater management of the site will be designed to primarily treat the runoff from the station.

Impacts to groundwater from the Raynham station are minimal because the station is not in a ground water protection Zone I or Zone II and the existing disturbed conditions of the site do not allow for infiltration. Treatment and detention of stormwater runoff will be required to reduce potential impacts to surface waters and wetlands of the adjacent Hockomock Swamp. Stormwater management BMPs including pavement sweeping, deep sump and hooded catchbasins, and swale or detention structures with sediment forebays will allow for a reduction of pollutants in the sites stormwater and will present an improvement from existing conditions at the site. Discharges of stormwater will occur at rates not exceeding the existing conditions and stormwater will not be directly discharged to surface waters or wetlands. Impacts to surface waters for the Raynham station will be mitigated by a stormwater management system, which will improve the existing conditions of the site.

Dean Street (Taunton)

The Dean Street station in Taunton will be approximately 5 acres and will be sited on existing impervious surfaces. The stormwater runoff from the parking area will be routed to catch basins equipped with deep sumps and hoods. The catchbasins will be connected by drainlines and will discharge to either vegetated swales or basins. Drainline discharges will be protected with rip rap to prevent erosion and reduce flow velocities. Basins and swales will be equipped with sediment forebays or stilling basins to increase the removal of suspended solids. The development of the Dean Street station will reduce impervious surface at the station site and will increase infiltration. The area near Arlington Street may be used for detention however the redevelopment of the site will reduce the stormwater volume by reducing impervious surface at the site. Stormwater management BMPs including pavement sweeping, deep sump and hooded catchbasins, and swale or detention structures with sediment forebays will allow for the site to meet the stormwater management standards as a redevelopment project. Redevelopment of the Dean Street station site will improve surface and ground water quality adjacent to the site.

Freetown

The Freetown station will create approximately 6 acres of new impervious surface and include a station platform, a pick up/drop off area, a commuter parking lot, and a train layover facility. The stormwater runoff from the parking area will be routed to catch basins equipped with deep sumps and hoods. The catchbasins will be connected by drainlines and will discharge to either vegetated swales or basins. Drainline discharges will be protected with rip rap to prevent erosion and reduce flow velocities. Basins and swales will be equipped with sediment forebays or stilling basins to increase the removal of suspended solids.

Station stormwater management design will attempt to maximize infiltration of treated stormwater to maintain recharge volumes, and reduce impacts to groundwater. Infiltration of treated stormwater at the site will be aided by the pervious soils found at the site. Retention and infiltration structures will likely be sited north and west of the proposed station. Discharge from the site will not be made to surface waters or wetlands. Stormwater management BMPs including pavement sweeping, deep sump and hooded catchbasins, and swale or detention/infiltration structures with sediment forebays will allow the site design to meet the stormwater management standards.

4.2.4 Regulatory Compliance

The New Bedford/Fall River Commuter Rail Extension Project will comply with state and federal regulations relating to surface water and ground water including Massachusetts Drinking Water Regulations (310 CMR 22.00), the U.S. EPA NPDES general permit for stormwater discharge from construction activity, the Massachusetts DEP/CZM Stormwater Management Policy, and the Massachusetts Rights-of-way Management Regulations (333 CMR 11.00). Section 4.1 of this DEIR discusses compliance with Water Quality Certification regulations (Section 401 of the Clean Water Act).

4.2.4.1 Massachusetts Drinking Water Regulations

The Massachusetts Drinking Water Regulations control the operation of public water systems in the state. These regulations include surface water supply protection and ground water supply protection. The Stoughton Branch is not within any surface water protection zones. Ground water supply protection includes a source approval process for public water supply wells [310 CMR 22.21]. This process includes the Zone I of the well be owned or controlled by the water supplier. The MBTA controls the Stoughton Branch therefore Zone Is should not occur within the alignment. Specific land uses are prohibited by zoning or nonzoning controls in the Zone II and Zone III areas under the source approval process. Commuter rail is not an excluded land use of the wellhead protection zoning and nonzoning controls as specified in [310 CMR 22.21 (2)]. Active commuter rail presently occurs in Zone II protection areas in Canton, Avon, and many other Massachusetts municipalities. The addition of rail service in Zone II or Zone III areas will not require permits under the DEP Drinking Water regulations and will comply with those regulations.

4.2.4.2 NPDES General Permit for Stormwater Discharge from Construction Activity

Construction projects greater than 5 acres in area are required to file an NPDES Notice of Intent with the U.S. EPA and prepare a Storm Water Pollution Prevention Plan (SWPPP) which must include a site description, a description of controls to be used on the site, and a description of maintenance and inspection procedures. This plan must be available for inspection on the construction site and must be updated as maintenance and inspections are preformed. A Notice of Intent under the NPDES general permit will be filed before reconstruction of railbed or station construction begins. A SWPPP will be prepared that includes the required elements described above including the pollution and erosion control measures used on the site described in section 4.2.3.4.

4.2.4.3 DEP/CZM Stormwater Management Policy

The DEP/CZM Stormwater Management Policy presents nine standards, which when met, demonstrate regulatory compliance. These policies and proposed measures to meet the standards are presented below.

1. *No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

   Construction and reconstruction of track will not result in new point source stormwater discharges. Construction of stations will create new stormwater discharges. At the stations all stormwater will be treated prior to discharge, discharges directly to wetland or surface waters will be avoided whenever possible, and erosion control measures at discharge points will ensure that erosion does not result from discharges.

2. *Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.*

   Track reconstruction will not increase discharge rates. Stations will include detention structures with outlet controls that will not release stormwater at rates greater than the existing site conditions.

3. *Loss of annual recharge to groundwater should be minimized through the use of infiltration measures where feasible.*

   The track ballast is designed to allow for rapid drainage of precipitation, which promotes infiltration. Station locations will be designed maintain existing ground water recharge volumes as much as possible through the use of structures such as infiltration galleries and infiltration basins.

4. *For new development, stormwater management systems must be designed to remove 80 percent of Total Suspended Solids.*

   The track will not create point source discharges; stone ballast, concrete tie, and steel rail construction of the track will not be a source of particulate matter. The stormwater management systems of the stations will include BMPs to reduce TSS levels including pavement sweeping, catch basins with deep sumps and hoods, basins with sediment forebays, and vegetated swales. The 80% removal rate will be met by both new development and redevelopment at the station sites.

5. *Stormwater discharges from areas with higher potential pollutant loads require the use of specific stormwater management BMPs.*

   The project will not include any area with a defined higher pollutant load.

6. *Stormwater discharges to critical areas must utilize certain stormwater management BMPs approved for critical areas. Critical areas are Outstanding Resource Waters, shell fish beds, swimming beaches, cold water fisheries and recharge areas for public water supplies.*

   Track will not create new stormwater discharge. All stations and especially those in or near critical areas such as North Easton (in a Zone II aquifer protection area) and Raynham (near an ORW, the Hockomock Swamp ACEC) will utilize BMPs such as deep sump and hooded catch basins, extended detention basins, and infiltration basins.

7. *Redevelopment of previously developed areas must meet the Stormwater Management Standards to the maximum extent practicable.*

   Work in previously disturbed and developed areas will improve stormwater management and attempt to meet the standards completely.

8. *Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities.*

   Construction will include the use of erosion and sedimentation controls as described in section 4.2.3.1. Erosion controls and their maintenance will be described in the SWPPP prepared as part of compliance with the NPDES general permit (4.2.4.2).

9. *All stormwater management systems must have an operation and maintenance plan to ensure that systems function as designed.*

   An Operations and Maintenance Plan for the stormwater management systems of the stations will be prepared.

4.2.4.4 Rights-of-Way Management Regulations

Maintenance of the Stoughton Branch will occur in compliance with the Rights-of-Way Management Regulations (333 CMR 11.00), which require the filing of a VMP and a YOP. A current VMP is on file with the DFA for the rail used in the New Bedford/Fall River project. Identification and marking of sensitive areas on the track of the Stoughton Branch (including the tracks from Weir Junction to New Bedford and Fall River) would occur during reconstruction. The reconstruction of the tracks would provide an initial control of vegetation as a secondary benefit. Future vegetation control would occur in conjunction with the filing of a YOP, which would include descriptions of dates, locations, and concentrations of specific herbicides used and will conform with the Rights-of-way management regulations as described in sections 4.2.2.2 and 4.2.3.3 of this Draft EIR.

4.3 Biodiversity

This section of the DEIR describes the biological resources within and adjacent to the Stoughton Alignment in terms of plant communities, wildlife, and rare species. Both direct and indirect effects are considered. Regulatory jurisdiction and compliance with local, state, and federal regulations is also discussed. Measures incorporated in the proposed project design to minimize, mitigate and compensate for impacts to biodiversity are described at the end of this section.

The Secretary's Certificate on the ENF determined that the Draft EIR contain the information required by the Natural Heritage Program to make proper determinations of the potential adverse impacts to the state-listed rare species occurring along the proposed route, and identify what means are available to avoid or minimize these impacts, and to provide safe and effective wildlife corridors across the right-of-way.

Biological diversity, or "biodiversity", is an assessment of the numbers, types, and relative abundance of plant and animal species in natural communities, and their relationships to each other and interactions with the environment. Biodiversity encompasses more than just species richness. It also includes the genetic differences among individuals, abundance or rarity of species in a landscape, and the variety of habitats, communities, ecosystems and landscapes in which species occur. The concept of biodiversity is a combination of the connections within and between these levels, and how the interrelated elements sustain the system as a whole.

For the purpose of this report, biodiversity is described primarily in terms of rare species and secondarily in terms of important wildlife and fisheries resources that are known to occur along the project alignment (defined as the centerline of the proposed railroad). The rationale for this focus is that rare species are often state-listed because of higher sensitivity to human practices, and they are often more habitat-specific than more common species.

4.3.1 Existing Conditions

This section describes the existing conditions along the project alignment, with particular emphasis on the alignment through the Hockomock and Pine Swamps. These areas are examined more closely because they provide higher biodiversity value than other portions of the project alignment because of the extensive wetlands and undeveloped nature of these swamps. Existing conditions are also briefly discussed for the Attleboro Alternative and the segment of rail south of Weir Junction that is shared by both the Stoughton and Attleboro Alignments.

4.3.1.1 Stoughton Branch

The project alignment consists of inactive right-of-way from Stoughton Station south to Winter Street in Taunton, and existing active freight rail from Winter Street south to terminal stations in Fall River and New Bedford.

The project alignment crosses through the towns of Stoughton, Easton, Raynham, Taunton, Lakeville, Freetown, Fall River and New Bedford and is heavily developed in some of these areas. Land uses include commercial and residential. The central portion of the project alignment crosses through the Hockomock and Pine Swamps. In these areas the right-of-way is surrounded by large, predominantly wetland, undeveloped tracts of land. From Foundry Street in Easton south to Bridge Street in

Raynham, these wetlands are contained in the Hockomock Swamp ACEC. The Hockomock ACEC was designated in 1990 and contains the largest freshwater wetland system in Massachusetts. The Hockomock Swamp ACEC comprises 16,800 acres in 6 towns (Bridgewater, Easton, Norton, Raynham, Taunton, and West Bridgewater), consisting primarily of extensive wetlands and floodplains. Several waterbodies including Lake Nippennicket, Gushee, Hewitt, and Nunket Ponds, the Hockomock, Town, and Snake Rivers, and Black, Cowesset, Flaggy Meadow and One Mile Brooks also are within the ACEC limits.

The condition of the existing railroad embankment varies along the project corridor. When rail service was originally established through the Hockomock and Pine Swamps, and other wetlands, a railroad embankment of fill and ballast was constructed to support the tracks. The entire length of the embankment in the Hockomock and Pine Swamps is currently upland, with wetlands occurring at the toe of slope along most of this length. The tracks in the swamps have been removed, and the existing rail embankment consists of vegetated slopes and berm. A closed tree canopy has formed over the railbed in some portions of the Hockomock Swamp. The railbed in the Hockomock and, to a lesser degree, Pine Swamp, is used as a trail for day hikers, mountain bikers, and motocross riders, although these are not public recreation areas. The railbed through the Hockomock Swamp is owned by the MBTA.

Plant Communities

The Hockomock Swamp ACEC contains two wetland plant communities listed by MNHESP as Priority Natural Communities. The first, acid fen plant communities, are characterized by sphagnum mosses and woody shrubs such as leatherleaf *(Chamaedaphne calyculata)*, bog rosemary *(Andromeda glaucophylla)*, and Labrador tea *(Ledum groenlandicum)* and occur outside the project alignment. The Atlantic white cedar swamp Priority Natural Community occurs along the project alignment and consists of Atlantic white cedar *(Chamaecyparis thyoides)* in association with red maple *(Acer rubrum)*, fetterbush *(Leucothöe racemosa)*, winterberry *(Ilex verticillata)*, and swamp azalea *(Rhododendron viscosum)*. The larvae of Hessel's hairstreak, a state-listed butterfly (described in the following section) feeds exclusively on Atlantic white cedar.

Other plant communities adjacent to the project alignment include smaller areas of red maple and tupelo *(Nyssa sylvatica)* forested, scrub-shrub, and emergent wetlands (described more fully in the *Wetlands* section of this report). Upland plant communities along the project alignment consist of pioneer communities dominated by quaking aspen *(Populus tremuloides)*, scrub oak *(Quercus ilicifolia)*, wild indigo *(Baptisia tinctoria)*, and goldenrod *(Solidago* spp.), as well as oak and white pine-dominated forested uplands.

Vernal Pools

Vernal pools provide an important wildlife habitat type. These are generally small, seasonally-inundated wetlands which lack fish and provide breeding habitat for amphibians (wood frogs, ambystomid salamanders), and which may be utilized by reptiles and other wildlife. No certified vernal pools are listed in the MNHESP's 1997-1998 *Atlas of Rare Species and Priority Sites* along the project alignment, but several vernal pools adjacent to the project alignment have been certified by the MNHESP and will be published in the upcoming edition of the *Atlas*. Numerous vernal pools, certified and uncertified, occur adjacent to the rail embankment. These are small pools or seasonal ponding areas within bordering vegetated wetlands, or small isolated wetlands. No vernal pools occur within the railroad right-of-way (on the embankment).

Rare Species

Fifteen state-listed plant and animal species occur within the project area, primarily in Hockomock Swamp. Only six of the 15 species, however, occur in habitat that may be potentially affected by the proposed commuter rail; they are described in this section. Ten species that occur within Hockomock Swamp are not discussed in this section because their mapped habitat is well outside of the project alignment. Figure 2.3-2 shows the areas of estimated habitat and priority sites mapped by MNHESP.

Blue-Spotted Salamander

Blue-spotted salamanders *(Ambystoma laterale)* are obligate vernal pool species, *i.e.*, confirmed breeding presence (generally by egg mass observations) is one of two biological indicators of a vernal pool. Blue-spotted salamanders occupy moist, moderately shaded environments, favoring northern hardwood/hemlock forests in glaciated areas. After the first warm spring rain, blue-spotted salamanders emerge from hibernation and travel to a vernal pool to mate and lay their eggs. Females lay eggs on submerged grasses and woody vegetation. Hatchlings emerge about one month later and are voracious feeders, feeding on insect larvae and small aquatic insects. Larvae metamorphose into adults by late summer and may live for decades.

Although there is no vernal pool habitat within the project alignment, MNHESP has stated that blue-spotted salamanders cross the railroad bed to access vernal pools to breed, based on a video submitted to the MNHESP showing blue-spotted salamanders crossing the right-of-way within the Hockomock Swamp during the breeding season.

Spotted Turtle

Spotted turtle (*Clemmys guttata)* populations occur in both Hockomock Swamp and Pine Swamp. Spotted turtles are state-listed as a Species of Special Concern. Within Massachusetts, the spotted turtle inhabits a variety of wetland habitats such as marshy meadows, bogs, small ponds and brooks, ditches, and other shallow unpolluted bodies of water. Red maple swamps, Atlantic white cedar swamps, and woodland vernal pools also provide suitable habitat. Nesting usually occurs from late May through late June in sunny, open areas with sandy or well-drained soils.

Along the project alignment, the railroad embankment provides patches of open grassy areas in upland soils. None of the open areas are very large, and have very compacted ballast-derived soils, but they may provide marginally suitable areas for nest digging and egg incubation. These areas are likely to be subjected to high predation rates because of the linear configuration of the rail bed, which facilitates predator searches for nests. However, on July 1, 1999, a female spotted turtle was observed laying eggs at the top of the railroad embankment in an area of open canopy in the Hockomock Swamp. Spotted turtles moving between areas of suitable habitat may also cross portions of the project alignment.

Blanding's Turtle

Blanding's turtle (*Emydoidea blandingii*), state-listed as a Threatened species, has been recorded in Hockomock Swamp. For most of the year, Blanding's turtles are found in nutrient-rich wetland systems with permanent, shallow water with no or little flow and a soft substrate, such as marshes, bogs, small ponds, and brooks. Pools of deeper water in these wetlands are used by the turtles to escape the heat of the summer and to hibernate during the winter. The turtle generally occurs in wetlands without a closed forest canopy, but with abundant shrubs and herbaceous vegetation including buttonbush (*Cephalanthus occidentalis*), cattail (*Typha latifolia*), duckweeds (*Lemna minor*), and sedges (*Carex* spp. and *Scirpus* spp.). These wetlands provide areas where the turtles can bask, feed, hide and estivate. Emergent and surface vegetation within the wetlands provides both basking areas for the turtle and habitat for the turtle's prey. Most nesting occurs from late May to late June, primarily in grasslands and other open areas.

As with the spotted turtle, the only habitat provided by the project alignment is marginal nesting habitat in areas where the canopy is open enough to allow sunlight to incubate the eggs for long enough periods of time for viable survival. Turtles moving between patches of suitable habitat may also cross portions of the project alignment. No occurrences of Blanding's turtles are known from the railroad embankment.

Mystic Valley Amphipod

The Mystic Valley amphipod (*Crangonyx aberrans*) is endemic to New England and occurs only in eastern Massachusetts. The Mystic Valley amphipod is state-listed as a Species of Special Concern. Within the project area, the Mystic Valley amphipod occurs in Hockomock Swamp. It inhabits cool, shallow, slow-moving (but not completely stagnant), permanent bodies of water. This species may occasionally be found in water bodies that periodically dry during hot summers. Under these circumstances, the juveniles reside in cool, moist pockets of water caused by seepage near the roots of emergent plants and other wetland vegetation. Amphipods, including the Mystic Valley amphipod, are typically detritivores and require accumulated dead organic matter in the form of leaf litter or other decomposing vegetation on which to feed. In eastern Massachusetts, swamps dominated by red maples *(Acer rubrum)* or Atlantic white cedars (*Chamaecyparis thyoides*) may provide suitable habitat for the Mystic Valley amphipod.

No habitat for the Mystic Valley amphipod occurs within the project alignment because the entire railroad berm is upland within the Hockomock and Pine Swamps. However, slow-moving streams in the adjacent forested swamps may provide suitable habitat.

Hessel's Hairstreak

Hessel's hairstreak (*Callophrys hesseli*) is a butterfly found in coastal plains from southern Maine to northern Florida. This hairstreak has been recorded in both Hockomock and Pine Swamps. Adults feed on nectar from swamp milkweed, shadbush, sand myrtle, sweet pepperbush *(Clethra alnifolia)*, highbush blueberry *(Vaccinium corymbosum)*, buttonbush, and dogbane. It occurs only in or adjacent to Atlantic white cedar swamps and associated barrens. Males perch at the tops of white cedars in spring to seek receptive females, and females lay single eggs on the terminal growth of white cedars. Larvae feed and develop into the pupal stage on the leaves of the host trees. Potential habitat along the project alignment for Hessel's hairstreak includes Atlantic white cedars that have grown up the sideslopes of the embankment.

Gypsywort

Gypsywort (*Lycopus rubellus*) has been recorded in Hockomock Swamp. Gypsywort is a coastal plain pond species occurring in smaller ponds with mucky to peaty soils, and is often associated with beach plants such as Plymouth gentian *(Sabatia kennedyana)*. According to MNHESP, the species is state-listed as Endangered because of habitat loss and degradation from development around coastal plain ponds, with resulting increases in beachfront use, activity and manipulation of water levels in ponds.

No habitat within the project alignment exists for the gypsywort because the plant occurs within standing bodies of water, and the project alignment is entirely upland within the Hockomock and Pine Swamps. There are no suitable coastal plain ponds located adjacent to the rail embankment.

Wildlife

The Hockomock and Pine Swamps likely provide outstanding habitat for several wildlife species. Access to several waterways within and adjacent to these swamps provides varied and valuable characteristics for maintaining and expanding populations, particularly for area-sensitive species. The wildlife value of the Hockomock Swamp is increased by the adjacent undeveloped upland, which provides habitat for upland species as well as breeding and overwintering habitat for wetland-dependent wildlife. Pine Swamp is surrounded by roads and development.

Species such as redback salamander and northern ringneck snake are likely to occur in forested habitats, while blue-spotted salamander are likely to occur along clear streams in forested areas. Eastern milk snake and eastern garter snake are likely to occur in a variety of habitats in the swamps. Forest cover types are also important to several mammal species, including numerous species of shrews, bats, and rodents, as well as deer. Cottontails may inhabit dense second-growth shrub cover types and edge habitats. Mammalian predators such as weasels, fox and coyote may hunt in shrub and herbaceous cover types as well as forested areas.

The large size and undeveloped nature of the Hockomock and Pine Swamps may provide habitat for area-sensitive wildlife such as ovenbird and black-and-white warbler, although Pine Swamp is generally open and does not provide continuous forested cover. The "core" or interior area necessary to maintain successfully reproducing populations varies widely, depending on the species context. Habitat requirement studies have been widely conducted on songbirds, particularly neotropical migrants (NTMs), which are declining in several parts of the world. In landscape studies, NTMs have been found to require areas at least 250 acres to maintain successful reproductive populations (Pagurek 1994[6], cited in Sorrell 1997[7], Robbins *et al.* 1989[8]); these are defined as core habitat. Smaller forested areas are thought to be "sinks" where local populations are likely to undergo frequent extinction and recolonization, while larger areas are thought to be "sources" which maintain stable populations and from which birds disperse to colonize smaller sites (Donovan *et al.* 1995[9], Robinson *et al.* 1995[10]).

The right-of-way itself is likely used primarily by edge species such as raccoons and fox for hunting and accessing wetland resources. In the more open areas of the project alignment, two depredated snapping turtles nests were found, which could indicate that linear nesting habitat, such as the berm, may be subject to higher rates of predation if it is also used as a travel corridor for species that prey on turtles' eggs. Avian species such as broad-winged hawks and great-crested flycatcher may also use trees at the edge of the railroad berm as perches for hunting. Amphibians and reptiles may cross the berm to access permanent or semi-permanent bodies of water.

Along the project alignment, the right-of-way itself provides limited habitat. Areas along the alignment where the canopy cover is not continuous across the

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[6] Pagurek, D. 1994. Landscape structure analysis of three landscapes in southern Ontario. M.S. Thesis, University of Western Ontario, Ontario, Canada.

[7] Sorrell, J.P. 1997. Using Geographic Information Systems to evaluate forest fragmentation and identify wildlife corridor opportunities in the Catarqui watershed. http://wgs.nhb.com/sorrell/index.htm/

[8] Robbins, C.S., D.K. Dawson, and B.A. Dowell. 1989. Habitat area requirements of breeding birds in the middle Atlantic states. Wildlife Monographs. No. 103.

[9] Donovan, T.M., F.R. Thompson III, J. Faaborg, and J.R. Probst. 1995. Reproductive success of migratory birds in habitat sources and sinks. Conservation Biology. 9(6): 1380–1395.

[10] Robinson, S.K., F.R. Thompson III, T.M. Donovan, D.R. Whitehead, and J. Faaborg. 1995. Regional forest success and the nesting success of migratory birds. Science. 267: 1987-1990.

embankment provide nesting habitat for turtles, though the compacted nature of the substrate precludes the embankment as optimal nesting habitat. More favorable turtle nesting habitat occurs within the gravel pits along the project alignment, where the lack of canopy and shrub cover, and the well-drained soils, provide suitable sites for nest digging and egg development.

Fisheries

Several perennial watercourses occur in the project area. The larger watercourses include the Taunton River, Queset Brook, Black Brook, Whitman Brook, Mill Creek, and Mill River. Waterbodies that are lower in the watershed (*i.e.*, the Taunton River and Mill River), likely provide spawning and migratory habitat for anadromous fish such as alewife, (*Alosa pseudoharengus)*, blueback herring *(A. aestivalis)*, and shad *(Alosa* spp.). It is unlikely that any of the other watercourses provide spawning or migratory habitat because of dams prohibiting upstream movement. None of the streams provide habitat for coldwater fisheries. Larger waterbodies in the project area include Kingsley Pond, and several unnamed ponds and impoundments. Section 4.2 - *Water Quality* describes surface and groundwater resources in the project area. Fisheries resources provide food sources for wildlife and recreational opportunities for residents and tourists alike. Several of the water bodies and waterways within the study area provide recreational fishing opportunities.

Wildlife Corridors

Wildlife corridors are linear areas of habitat that link two or more larger areas of core habitat. They do not necessarily provide breeding habitat (or they would be considered core habitat) and are often heavily influenced by edge effects (McCullough 1996[11]).

Corridors are important to biodiversity preservation because they enable species to disperse from areas of high competition into suitable habitat with less competition, thereby increasing the overall metapopulation success. In addition, corridors promote gene exchange between subpopulations, raising the effective population size and decreasing potential impacts of genetic drift and inbreeding depression.

The project alignment does not provide an important wildlife corridor that connects two areas of core habitat (*i.e.*, the Hockomock and Pine Swamps) because the at-grade crossing of the alignment of Route 138 inhibits wildlife movement. Several studies have shown that wildlife avoid roadways and adjacent areas because of increased noise, pollution, visual disturbance, and the use of roadway corridors by predators (Ferris 1977[12], Adams and Geis 1981[13], Palman 1977[14]).

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[11] McCullough, D.R. (ed.). 1996. Metapopulations and wildlife conservation. Island Press, Washington D.C.

[12] Ferris, C.R., D.S. Palman, and V.B. Richens. 1977. Ecological impact of Interstate 95 on birds and mammals in northern Maine. Report No. TP-77-12. Maine Department of Transportation, Augusta, ME.

[13] Adams L.W. and A.D. Geis. 1981. Effects of highways on wildlife. Report No. FHWA-RD-81-067. Federal Highway Administration, U.S. Department of Transportation. Washington, D.C.

[14] Palman, D.S. 1977. Ecological impact of Interstate 95 on small and medium-sized mammals in northern Maine. M.S. Thesis, University of Maine (Orono).

4.3.1.2 Attleboro Bypass

As described in the 1995 ENF, the Attleboro Bypass occurs primarily within a powerline right-of-way and along an existing railroad right-of-way. Similar to the Stoughton Alignment, the Attleboro Bypass Alignment crosses upland second-growth forest, forested wetlands, shrub swamps, emergent wetlands, powerline clearcuts, agricultural land, and intermittent and perennial streams. One pond (Chartley Pond) is crossed by this alignment. The proximity of the forested habitats to the shrub and herbaceous communities, as well as the interspersion of uplands and wetlands, provides habitats for a variety of wildlife species.

The forest areas provide good structural diversity, with well-developed herbaceous, shrub, and tree layers. This diversity promotes the use of the forest by wildlife species that utilize the ground, intermediate, and canopy layers. Where older trees occur, they provide nesting and roosting cavities for birds and mammals. Many of the plants in the forest communities, including oaks, pine, viburnums, and blueberry, provide good food resources for various species of wildlife.

The forest areas in the vicinity of the proposed Attleboro Bypass provide habitat that supports several mammal species. White-tailed deer (*Odocoileus virginianus*), eastern gray squirrel (*Sciurus carolinensis*), and eastern chipmunk (*Tamias striatus*) are common in deciduous and mixed forests throughout southeastern Massachusetts. Other mammals likely to occur in these forests include southern flying squirrel (*Glaucomys volans*), white-footed mouse (*Peromyscus leucopus*), and red and gray foxes (*Vulpes a* and *Urocyon cinereoargentatus*). Raccoons often forage in forested swamps for frogs and aquatic invertebrates such as crayfish.

The forests of the area also provide important habitat for a variety of breeding bird species. Birds such as red-eyed vireo (*Vireo olivaceus*), scarlet tanager *(Piranga olivacea*), eastern wood-pewee (*Contopus virens*), ovenbird (*Seiurus aurocapillus*), and black-and-white warbler (*Mniotilta varia*) nest in interior forest habitats provided by larger forest blocks such as those found in the area of the proposed bypass. The forests of the project area are likely to also provide habitat for other species which do not necessarily require the interior forest habitats provided by large unfragmented forest blocks. Such species include black-capped chickadee (*Parus atricapillus*), blue jay (*Cyanocitta cristata*), and northern cardinal (*Cardinalis cardinalis*). Species such as red-tailed hawk and broad-winged hawk (*Buteo jamaicensis* and *B. platypterus*) nest in forests such as those in the project area, but forage widely in the forests as well as in the adjacent shrub and herbaceous habitats.

Shrub habitats in the vicinity of the proposed Attleboro Bypass are provided by the powerline right-of-way. Much of the powerline right-of-way is dominated by upland shrub communities. Species such as scrub oak (*Quercus ilicifolia*), sweetfern (*Comptonia peregrina*), lowbush blueberry, sassafras (*Sassafras albidum*), little bluestem (*Schizachyrium scoparium*) and various goldenrods (*Solidago* spp.) grow in the dry, sandy soils that occur throughout much of the cleared powerline right-of-way.

Shrub swamps occur in many areas containing more poorly drained soils. The shrub swamps within the project area are generally dominated by highbush blueberry (*Vaccinium corymbosum*), arrowwood, red maple, and sweet pepperbush (*Clethra alnifolium*). Leatherleaf (*Chamaedaphne calyculata*) is also common in several shrub swamps in the area. One bog dominated by leatherleaf occurs on the west side of the powerline right-of-way just north of Chartley Pond.

The shrub dominated areas provide habitat for a variety of wildlife species. The dry shrub thickets within the powerline right-of-way provide nesting habitat for prairie warblers (*Dendroica discolor*), blue-winged warbler (*Vermivora pinus*), gray catbird (*Dumetella carolinensis*), and rufous-sided towhee (*Pipilo erythopthalmus*), while yellow warbler (*Dendroica petechia*), common yellowthroat (*Geothlypis trichas*), and song sparrow (*Melospiza melodia*) are common in the wetland shrub thickets. Predatory species such as red and gray foxes, red-tailed hawk, and great horned owl (*Bubo virginianus*) breed in forested habitats, but hunt for prey species such as the white-footed mouse, meadow vole (*Microtus pennsylvanicus*), and eastern cottontail (*Sylvilagus fflloridanus*) which inhabit non-forest habitats, such as those provided by the shrub thickets of the powerline right-of-way.

Herbaceous habitats in the vicinity of the proposed Attleboro Bypass are provided by agricultural fields and emergent wetlands. Several small agricultural fields occur in the area of the proposed Attleboro Bypass. These fields are used to grow hay, and are thus dominated by various grass species. These fields are much smaller than the extensive grassland areas required to support populations of field-nesting birds such as eastern meadowlark (*Sturnella magna*), bobolink (*Dolichonyx oryzoides*), and grasshopper sparrows (*Ammodramus savannarum*) . These fields are likely to provide habitat for certain small mammals, including meadow voles, and short-tailed shrews (*Sorex brevicauda*). These fields may also provide foraging habitat for species inhabiting the forest edge. White-tailed deer and eastern cottontail are likely to forage on the plants in the fields, while predators such as red-tailed hawk, foxes, and long-tailed weasel (*Mustella frenata*) may venture into the fields to prey on the small mammals that inhabit the fields. Additionally, certain birds, including the American robin (*Turdus migratorius*) and American crow (*Corvus brachyrhynchus*) often nest in forested areas and forage for insects, worms, and grubs in nearby fields.

Emergent wetlands occur at several locations in the vicinity of the proposed Attleboro Bypass, particularly within the powerline right-of-way and along the borders of Chartley Pond near the southern terminus of the bypass route. Dominant species in these emergent wetlands include broad-leaf cattail (*Typha latifolia*), tussock sedge (*Carex stricta*), and burreed (*Sparganium* spp.). Emergent wetlands are important habitat for certain species of reptiles and amphibians. Species such as American toad (*Bufo americanus*), northern spring peeper (*Hyla c. crucifer*), and green frog (*Rana clamitans melanota*) are likely to breed in emergent wetlands with pools of shallow water, while eastern ribbon snakes (*Thamnophis s. sauritus*) may frequent such wetlands to prey on the amphibians that breed there. Emergent wetlands are important nesting habitat for common yellowthroats and red-winged blackbirds

(*Agelaius phoeniceus*). Emergent wetlands also provide foraging habitat for species such as raccoon which hunt for frogs and aquatic invertebrates in wetland areas.

Open water habitat in the vicinity of the proposed bypass is limited to Chartley Pond. Chartley Pond is a small reservoir created by a dam on Chartley Brook. Much of the pond is bordered by forest, shrub, and emergent wetlands that provide breeding habitat for aquatic vertebrates such as mallard (*Anas platyrhynchos*), wood duck (*Aix sponsa*), green frog, and painted turtle (*Chrysemys picta*). Chartley Pond supports a breeding population of mute swans (*Cygnus olor*). The pond itself supports populations of fish which attract fish-eating birds such as great blue heron (*Ardea herodias*) and belted kingfisher (*Ceryle alcyon*). An osprey (*Pandion haliaeetus)* was observed near this area during field reconnaissance in 1995. Certain species, including tree swallow (*Iridoprocne bicolor*), barn swallow (*Hirundo rustica*), and various bats commonly forage for flying insects over waterbodies. In the spring and fall Chartley Pond may provide resting and foraging habitat for various species of migratory waterfowl.

Unless mitigated, the proposed commuter rail will likely create a new barrier to wildlife movement. The Attleboro Bypass Alignment does not cross any mapped state or federal rare species habitat or certified vernal pools.

4.3.1.3 South of Weir Junction

The proposed commuter rail alignment from Weir Junction south to New Bedford and Fall River would be used by both the Stoughton and Attleboro Alignments and occurs on track currently used for freight rail. The alignment occurs entirely on an upland berm but crosses wetlands, including Acushnet Cedar Swamp and several perennial and intermittent streams. The Acushnet Cedar Swamp, an 1800-acre state reservation in New Bedford, is likely to provide valuable wildlife habitat. However the existing rail currently passes through the northeastern corner of this swamp, and already consists of an upland berm through a wetland. Therefore, reconstructing this section of track for commuter rail will not create a barrier to wildlife movement.

The alignment passes through the cities of Taunton, Fall River, and New Bedford and is highly developed in these areas. Undeveloped land along this alignment is similar to both the Stoughton and Attleboro Alignments and consists of second-growth deciduous and mixed forested uplands and wetlands, shrub swamps, and emergent wetlands.

The existing freight rail in this section of the proposed commuter rail line is adjacent to, or crosses through, 4 areas of mapped estimated habitats and 3 priority sites. The existing rail is an upland embankment surrounded in areas by wetlands. The existing freight rail already separates habitat on either side of the embankment which has created a barrier that prevents or deters wildlife crossing over the embankment.

Existing culverts under the berm maintain wetland hydrology and provide crossing points for migratory wildlife to access wetland areas on either side of the embankment.

4.3.2 Biodiversity Impacts

The proposed project is expected to have minor direct and indirect effects on wildlife and plant populations. This section discusses direct and indirect effects in general, and describes the specific potential effects that the proposed commuter rail may have on biodiversity.

Actual habitat loss is a direct effect of transportation projects. Habitat loss occurs if an area that previously provided food, cover, water, and/or breeding resources to a species is cleared, paved, or altered in such a way that it no longer provides one or more of these resources.

Indirect effects include habitat fragmentation and associated 'edge effects'; the loss of genetic diversity of plant and animal populations, increased competition for resources, and physical or psychological restrictions on movements caused by some feature within a corridor that wildlife are unwilling or unable to cross. Indirect effects can be caused by the increased noise and visual disturbance from land-clearing, earth-moving, and construction machinery during construction. Following construction, noise associated with the active rail line may cause indirect effects if wildlife avoid habitat near the embankment. Because indirect effects change the quality or functions of a resource, they are measured qualitatively and, therefore, are more difficult to accurately assess than direct effects.

Fragmentation is defined as the subdivision of once large and continuous tracts of habitat into smaller patches. It results from agriculture, urbanization, and transportation or other rights-of-way (Rosenfield *et al.* 1992[15]). Fragmentation clearly has consequences on wildlife communities. In general, fragmentation of habitat is viewed as detrimental when considering original native, climax species composition and abundance, natural history, and relative ecological stability of unmanaged plant and animal populations. Scientific experts agree that preservation of continuous forest blocks is essential to the long-term protection of biodiversity. However, there is considerable controversy among the scientific community as to what are the critical dimensions of 'unfragmented' forests needed to sufficiently protect wildlife habitat and biodiversity.

The available scientific literature provides some information on the size of forests needed to support populations of neotropical migrant bird species (NTMs). These studies document a positive correlation between the presence and abundance of

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[15] Rosenfield,R.N., C.M. Morasky,. J. Bielefeldt, and W.L. Loope. 1992. Forest fragmentation and island biogeography: a summary and bibliography. U.S. Department of the Interior Technical Report NPS/NRUW/NRTR 92/08.

NTMs, their reproductive success, and the size of a forest block (Ambuel and Temple 1983[16], Askins *et al.* 1987[17], Blake and Karr 1984[18], Freemark and Merriam 1986[19], Flather and Sauer 1996[20]). The "core" or interior area necessary to maintain successfully reproducing populations varies widely, depending on the species context. In landscape studies, NTMs have been found to require areas at least 250 acres to maintain successful reproductive populations (Pagurek 1994[21], cited in Sorrell 1997[22], Robbins *et al.* 1989[23]). In general, smaller forest blocks are thought to be "sinks" where local populations are likely to undergo frequent extinction and recolonization, and larger forest blocks are thought to be "sources" which maintain stable populations and from which birds disperse to colonize smaller sites (Donovan *et al.* 1995[24], Robinson *et al.* 1995[25]).

Scientific studies generally support the positive correlation between size of a forest and reproductive success of NTMs, and that minimum threshold levels are necessary to maintain successful breeding populations. Forest areas that are less than 12 to 25 acres do not support area-sensitive forest-nesting NTMs (Blake and Karr 1984[26], Herkert 1993[27], Freemark and Collins 1989[28]).

The available studies indicate that forest blocks smaller than 60 acres may contain nesting NTMs, but that reproductive success is limited and species diversity is low. These should be considered "small" (Donovan et al. 1995[29], Villard *et al.* 1993[30]).

Studies indicate that forest blocks averaging 125-150 acres meet the definition of moderate. These are likely to support some NTMs, particularly the "common" species such as rose-breasted grosbeak, red-eyed vireo, or eastern peewee, but do not support the less common area-sensitive species such as yellow-throated vireo, hermit thrush, or veery (Freemark and Collins 1989, Robbins *et al.* 1989). Large forest blocks,

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[16] Ambuel, B. and S.A .Temple. 1983. Area-dependent changes in the bird communities and vegetation of southern Wisconsin forests. *Ecology*, 64(5), 1983. pp. 1057-1068.

[17] Askins, R.A.; M.J. Philbrick and D.S. Sugeno Relationship between regional abundance of forest and the composition of forest bird communities. *Biological Conservation* 39, pp. 129-152.

[18] Blake, J.G. and J.R Karr. 1984. Species composition of bird communities and the conservation benefit of large versus small forests. *Biological Conservation*. 30:173-187.

[19] Freemark, K. and B. Collins. 1989. Landscape ecology of birds breeding in temperate forest fragments. In Ecology and conservation of neotropical migrant landbirds (J.M. Hagan & D. W. Johnston, eds.). Smithsonian Institution Press, Washington D.C.

[20] Flather, C.H. and Sauer, J.R. 1996. Using landscape ecology to test hypotheses about large scale abundance patterns in migratory birds. *Ecology*. 77(1): 28-35.

[21] Pagurek, D. 1994. Landscape structure analysis of three landscapes in southern Ontario. M.S. Thesis, University of Western Ontario, Ontario, Canada.

[22] Sorrell, J.P. 1997. Using Geographic Information Systems to evaluate forest fragmentation and identify wildlife corridor opportunities in the Catarqui watershed. http://wgs.nhb.com/sorrell/index.htm/

[23] Robbins, C.S., D.K. Dawson, and B.A. Dowell. 1989. Habitat area requirements of breeding birds in the middle Atlantic states. *Wildlife Monographs*. No. 103.

[24] Donovan, T.M., F.R. Thompson III, J. Faaborg, and J.R. Probst. 1995. Reproductive success of migratory birds in habitat sources and sinks. *Conservation Biology*. 9(6): 1380–1395.

[25] Robinson, S.K., F.R. Thompson III, T.M. Donovan, D.R. Whitehead, and J. Faaborg. 1995. Regional forest success and the nesting success of migratory birds. *Science*. 267: 1987-1990.

[26] Blake, J.G. and J.R Karr. 1984. *Ibid.*

[27] Herkert, J.R. 1993. The effects of habitat fragmentation on midwestern grassland bird communities. Ecological Applications Vol. 4 No.3 pp. 461-471.

[28] Freemark, K. and B. Collins. 1989. *Ibid.*

[29] Donovan, T.M., F.R. Thompson III, J. Faaborg, and J.R. Probst. 1995. Reproductive success of migratory birds in habitat sources and sinks. *Conservation Biology*. 9(6): 1380–1395.

[30] Villard, M., P.R. Martin and C.G. Drummond. 1993. Habitat fragmentation and pairing success in the ovenbird *(Seiurus aurocapillus)*. *Auk* 110(4) pp. 759-768.

which provide sufficient contiguous forest-interior habitat to support successfully reproducing populations of area-sensitive forest-interior nesters such as ovenbird or Louisiana waterthrush, must be over 500 acres (Finch 1991). Several studies suggest that 750 to1200 acres are necessary (Donovan et al. 1995, Faaborg et al. 1995, Gibbs and Faaborg 1990, Porneluzi et al. 1992, Robbins et al. 1989), and that even larger areas in excess of 7500 acres are optimal.

If the more open portions of the railroad right-of-way through Hockomock Swamp are not considered as a fragmenting factors, the swamp consists of approximately 2,700 acres of unbroken forest, bounded by the powerline right-of-way to the north, Howard Street and developed areas to the west, I-495 to the south, and Route 138 to the east. (The Hockomock Swamp contains other portions of continuous forest east of Route 138, but they are not considered for this analysis since Route 138 acts as a fragmenting factor to the forested swamp in the vicinity of the project alignment). Based on its size, Hockomock Swamp likely supports successfully reproducing populations of area-sensitive NTMs.

Pine Swamp consists of approximately 475 acres of unbroken forest, bounded by King Philip Street and developed areas to the north and east, Route 138 to the west, and developed areas and Thrasher Street to the south. Based on its size, Pine Swamp likely supports common NTMs, and may support other, more area-sensitive species.

A railroad corridor may act as a barrier that interferes with the movement of some mammals, amphibians, birds and reptiles from one habitat to another. The width of a railroad corridor can influence the frequency of wildlife crossings, as well as the mortality associated with potential collisions with rail traffic. The rail itself on which the tracks are laid can create a barrier to smaller species such as amphibians, reptiles, and smaller mammals. Traffic density and traffic speed may also influence wildlife avoidance of transportation corridors (Reijnen 1995[31], Reijnen and Meeuwsen 1996[32], and Reijnen *et al.* 1995[33], cited in Forman and Alexander 1998[34]).

4.3.2.1 Impacts to Rare Species

Habitats of three of the six rare species along the project alignment are likely to experience direct effects from the proposed project. Four of the six species may experience indirect effects to some extent. Direct and indirect effects to rare species are described in this section.

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[31] Reijnen, R. R. Foppen, C. ter Braak, and J. Thissen. 1995. The effects of car traffic on breeding bird populations in woodland. III. Reduction of density in relation to the proximity of main roads. Journal of Applied Ecology. 32: 187-202.

[32] Reijnen, R., R. Foppen, and H. Meeuwsen. 1996. The effects of traffic on the density of breeding birds in Dutch agricultural grasslands. Biological Conservation. 75: 255-260.

[33] Reijnen, R. 1995. Disturbance by car traffic as a threat to breeding birds in The Netherlands. PhD thesis, DLO Institute of Forestry and Natural Resources. Wageningen, Netherlands.

[34] Forman, R.T.T. and L.E. Alexander. 1998. Roads and their major ecological effects. Annual Review of Ecological Systems. 29:207-31.

Blue-spotted Salamander

No direct habitat loss to blue-spotted salamanders is expected by the proposed project. Indirect effects may result from the installation of new track, which will create a barrier to blue-spotted salamanders that currently use the berm to access breeding areas.

Spotted Turtle

Although the railroad berm is not considered optimal nesting habitat, some spotted turtle nesting habitat loss in more open areas will occur.

The existing abandoned railbed is on an upland berm consisting of a heavily compacted substrate, which is generally unfavorable to nesting turtles because of the difficulty in digging a nest through compacted soil. However, a female spotted turtle was observed laying eggs on the berm on July 1, 1999. Although the railbed is unforested, dense vegetation overhangs most of the right-of-way in both Hockomock Swamp and Pine Swamp, and sunlight most likely reaches the soil for only a few hours per day in the nesting season. For these reasons, it is unlikely that the upland berm provides optimal habitat for nesting spotted turtles.

The steel rail may prohibit turtles from crossing the berm if they currently cross the railroad bed to access feeding or breeding areas. However, there are frequent culverts beneath the railbed that permit animals to move between the wetland systems. Unless mitigated, the barrier effect between wetlands may potentially separate one population into two smaller ones. Spotted turtle mortality may increase by turtles being struck by trains if they are able to climb the rail, but this is not expected because the steel rail does not offer traction that would enable climbing.

Blanding's Turtle

No habitat loss for Blanding's turtles is anticipated by the proposed project since there is no known nesting habitat on the berm. Indirect effects are expected to be similar to those for spotted turtles (i.e., decreased access between wetlands).

Mystic Valley Amphipod

No direct or indirect effects to the Mystic Valley amphipod are anticipated because the proposed project alignment does not contain suitable habitat for this amphipod. However, culvert and bridge replacement may temporarily affect habitat in some locations adjacent to the railbed.

Hessel's Hairstreak

The proposed commuter rail would result in the loss of potential breeding habitat for Hessel's hairstreak by removing 16 Atlantic white cedar trees that have colonized or overhang the railroad embankment in Pine Swamp. In addition, three Atlantic white cedars trees which are rooted outside the work area (also in Pine Swamp) may need to be removed. The loss of these trees may constitute habitat loss for the hairstreak because the females lay eggs in Atlantic white cedars, and the larvae feed and pupate on this species.

Gypsywort

No habitat loss for the gypsywort is expected because there are no coastal plain ponds in or adjacent to the railroad right-of-way.

4.3.3.2 Impacts to Wildlife

The high species diversity of the Hockomock and Pine Swamps is expected to experience indirect effects including lowered reproductive success if the commuter rail interrupts a migration route to a breeding area. There may also be increased parasitism on songbirds if brown-headed cowbirds colonize the edges adjacent to the rail. Predation on small mammals, amphibians, and songbirds may also increase as opportunist predators such as crows and raccoons move into the edges adjacent to the project alignment. However, the existing railbed is open and used as a trail, so there are likely to be some existing predation-related edge effects under existing conditions. Species most likely to be affected are songbirds and small mammals.

Large mammals such as white-tailed deer would likely continue moving across the alignment but may experience higher mortality. Impacts to wildlife from fencing are expected to be negligible because fencing is proposed only in areas of high residential use, and not in the Hockomock Swamp or other sensitive wildlife areas.

Several studies suggest that while amphibians and reptiles tend to avoid roads, roads by wetland areas have the highest roadkill rates (Asheley and Robinson 1996[35], cited in Forman and Alexander 1998[36], Fahrig *et al.* 1995[37].). While the commuter rail will be much less traveled than a roadway, some mortality is expected. Populations whose individuals currently cross the right-of-way to access feeding or breeding sites can be expected to experience increased mortality rates. However, increased mortality has been shown to have no significant effects on populations that are stable and reproduce quickly (Hodson 1966[38], cited in Forman and Alexander 1998[39]).

The proposed commuter rail will bisect the Hockomock and Pine Swamps. In the Hockomock Swamp, the remaining forests on either side of the rail will be 2,350 acres to the west, and 350 acres to the east. The western portion will continue to provide

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[35] Asheley, EP, Robinson JT. 1996. Road mortality of amphibians, reptiles and other wildlife on the Long Point causway, Lake Erie, Ontario. Can. Field Nat. 110:403-12

[36] Forman, R.T.T. and L.E. Alexander. 1998. Roads and their major ecological effects. Annual Review of Ecological Systems. 29:207-31.

[37] Fahrig, L., J.H. Pedlar, S.E. Pope, P.D. Taylor, and J.F. Wegner. 1995. Effect of road traffic on amphibian density. Biological Conservation. 73: 177–182.

[38] Hodson, 1966. A survey of road mortality in mammals (and including data for the grass snake and common frog). J. Zool, Lond. 148:576-79

[39] Forman, R.T.T. and L.E. Alexander. 1998. Roads and their major ecological effects. Annual Review of Ecological Systems. 29:207-31.

sufficient size to support all area-sensitive species successfully that currently may be present. The eastern fragment will likely support more common NTMs, but the proposed railroad may displace the more area-sensitive species. In Pine Swamp, the western side of the railroad will consist of 190 acres of continuous forest, and the eastern side will consist of 285 acres. It is probable that the majority of the NTMs in Pine Swamp will continue to breed successfully following construction, though there may be displacement of a small number of more area-sensitive forest nesters.

Also, it is possible that the commuter rail will displace some individuals of wildlife populations that are sensitive to noise and vibration, causing increased competition for nearby suitable habitat. Woodland songbirds such as the black-billed cuckoo have been shown have lowered reproductive success adjacent to noise sources, possibly due to increased stress hormones, interference with communication during the breeding season, or reduced food supply from noise avoidance of prey (Forman and Alexander 1998[40]).

4.3.2.3 Impacts to Wildlife Corridors

The proposed commuter rail along the Stoughton Branch may affect wildlife corridors because species that travel along the berm, such as deer, coyote, and raccoon, will be prohibited from doing so once train service is established (where there isn't a maintenance road). However, species that travel along the toe-of-slope will not be affected by the proposed project because the existing toe-of-slope will be maintained.

No effects to wildlife crossing through culverts are anticipated by the proposed project because culverts in the project area will be replaced in kind. Species that use culverts to pass between wetlands in the project area are expected to continue to be able to do so.

4.3.3.4 Construction Impacts

The construction of the Stoughton Branch will require the restoration of track, bridges and culverts. Replacing or extending existing culverts may have temporary effects on wetlands and waterways in the project area, but the use of proper erosion and sedimentation controls will minimize effects to receiving waters. Section 4.2 in this chapter provides details on erosion and control measures. Section 4.1 in this chapter discusses construction methods that will be used to avoid impacts to toe-of-slope wetlands in Hockomock and Pine Swamps.

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[40] Forman, R.T.T. and L.E. Alexander. 1998. Roads and their major ecological effects. Annual Review of Ecological Systems. 29:207-31.

4.3.2.5 Station Impacts

All new commuter rail stations considered in this DEIR (the 3 proposed for the Stoughton Branch and the 2 relocated stations on the Fall River Secondary) will be constructed in disturbed or previously developed areas. No impacts to biodiversity are anticipated. As described in the ENF, there will be no impacts to rare species habitat or biodiversity associated with the construction of the East Taunton, Fall River, or New Bedford stations, which will be constructed in previously disturbed or urban areas.

North Easton Station

The North Easton Station is a new station to be constructed on the Easton/Stoughton town line. The station is proposed on the east side of the Alignment in an area partially consisting of a heavily disturbed, mostly unvegetated area, and partially within a mixed forested area.

Impacts to biodiversity are expected to be minimal and will result in increased edge effects surrounding the station. No mapped rare species habitats occur in proximity to the station.

Raynham Station

The Raynham Station is a new station that will be constructed in a disturbed area adjacent to the north buildings of the Raynham Racetrack. The area is mostly paved and has been previously altered. Stormwater controls will be implemented into the project design to improve the water quality of runoff leaving the site and entering the receiving waters, which flow into the ACEC.

Effects to biodiversity are expected to be minimal from construction of this station because the station will be constructed in disturbed upland that is mostly paved.

Taunton (Dean Street) Station

This station is proposed approximately 300 feet north of Dean Street. The surrounding area is developed and no impacts to biodiversity are anticipated.

Battleship Cove Station

Effects to biodiversity are expected to be minimal from construction of this station because the station site is currently developed and in an urban area.

Freetown Station

This station has been relocated from the site originally described in the ENF. This proposed site consists of an inactive gravel pit and has been extensively altered. Impacts to biodiversity are expected to be low because of the previous alteration.

4.3.3 Mitigation

Mitigation for impacts to biodiversity can enhance valuable wetlands and provide or reestablish wildlife corridors. For this project, the most successful mitigation may be to enhance sites that currently provide habitat, and create breaks from the barrier posed by reconstructing track. Fencing will only be used in residential areas and will not impede wildlife movement through sensitive wildlife areas. The MBTA is committed to work with the Natural Heritage Program and DEM to identify design measures that would mitigate for biodiversity effects resulting from this project.

4.3.3.1 Maintain Migratory Corridors

All culverts within the project corridor will be replaced in kind (if replacement is found to be necessary for structural reasons), and design measures will be identified to maintain existing hydrology between wetland systems. This will allow movement through existing culverts to continue. Constructing wildlife underpasses and maintaining existing riparian corridors also allows wildlife movement to continue. Many species, including large and small mammals, reptiles and amphibians, will use areas under bridges to access breeding and feeding areas. Wildlife underpasses can maintain travel passages for species that may be prohibited from crossing the tracks (such as salamanders and frogs) as well as enhance travel passages for wildlife such as deer and small mammals that may be deterred from crossing an active rail line. Drift fences directing movement to these underpasses can facilitate wildlife passage. Constructing underpasses in known migratory passages, as well as in or near areas with landscape features that provide a connective function (such as shrubby areas that provide cover) can further increase use of these passages. Efforts to provide a natural substrate and natural light may also encourage some species to use culverts (Jackson and Griffin 1998[41]).

4.3.3.2 Enhance and Replace Habitat

Replacing wetlands adjacent to large, productive wetland systems can increase biodiversity (See 4.1-*Wetlands*). In addition, mitigation for rare species impacts to species such as spotted turtle can be accomplished by providing suitable nesting habitat in areas where individuals have been recorded. For example, portions of the abandoned gravel pits that are proposed as potential wetland mitigation (see 4.1-*Wetlands)* could be planted with low, clump-forming native perennials interspersed with shrub species. This proposed nesting habitat could be maintained to provide sunny, well-drained habitat preferred by nesting females. Harrowing every 5 to 10 years to ensure the soil does not become compacted and replanting with native perennial grasses to prevent the site reverting to pioneer forested upland

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[41] Jackson, S.D. and C.R. Griffin. 1998. In Proceedings of the international conference on wildlife ecology and transportation (G.L. Evink, P. Garrett, D. Zeigler, and J. Berry, eds.). Report No. FL-ER-69-98. Tallahassee, FL.

could provide benefits to nesting rare turtles in the project area. This may also provide benefits to species such as snapping turtle that also currently use the project alignment for nesting.

To mitigate for habitat loss to Hessel's hairstreak, Atlantic white cedars would be planted to provide additional egg-laying and larvae-feeding habitat. Other native species can be planted along the project alignment to discourage invasion by weedy species in newly disturbed areas along the right-of-way.

4.3.3.3 Timing and Methods of Construction

Timing of construction may affect the extent of impacts to fish and wildlife species. Disturbance of habitat during the breeding season is likely to have greater short-term or individual effects on reproductive success, though short-term effects are not likely to have long-term repercussions unless the species population is already unstable. To avoid potential short-term effects to breeding wildlife, all efforts will be taken to avoid construction during the breeding season (April through June) in Hockomock and Pine Swamps. In all cases construction will be limited to normal daylight hours.

Construction impacts to aquatic resources will be mitigated by the appropriate use of erosion and sedimentation controls to minimize and eliminate sedimentation of wetlands and waterways. Erosion and sedimentation controls would be installed before construction begins, properly maintained, and removed after disturbed areas have stabilized.

4.3.4 Regulatory Compliance

There are no federal or state regulations that specifically regulate biodiversity. Federal and state laws protect rare plants and animals and their critical habitats. This section describes the federal and state regulations that protects rare species and, in some instances, their habitats.

4.3.4.1 Federal Endangered Species Act

The federal Endangered Species Act of 1973 (16 USC 1531 *et seq.*, as amended) protects those plants and animals that have been determined to be Endangered or Threatened. The U.S. Fish and Wildlife Service administers the Act. No federally-listed species occur within the project area.

4.3.9.2 Massachusetts Endangered Species Act

Massachusetts enacted the state Endangered Species Act [MESA (M.G.L. Chapter 131A)] in 1990. The Act and its regulations (321 CMR 10.00) prohibit the "taking" of any state-listed rare plants and animals unless specifically permitted for scientific, educational, or propagation purposes. There are three categories under Massachusetts law to protect rare species: Endangered, Threatened, and Species of Special Concern. The Endangered and Threatened categories parallel the federal definition, but apply only to Massachusetts populations; state-listed species are not necessarily federally-listed. Species of Special Concern includes those species that biological research has documented to have suffered a decline that could threaten the species if the decline continues unchecked, or those species that occur in such small numbers or with such a restricted distribution that they could easily become Threatened within the Commonwealth. The MNHESP is responsible for insuring compliance with MESA.

Habitat of state-listed Threatened or Endangered Species may be designated as Significant Habitat (321 CMR 10.11-10.18) through a formal regulatory process that includes a public hearing. Significant Habitat may not be altered without a permit from the MNHESP. There is no designated Significant Habitat within the project area.

A Conservation and Management Permit (321 CMR 10.04(3)(b)) is required if MNHESP determines that the project will result in a "take" defined as follows:

- for animals - "to harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process, disrupt the nesting, breeding, feeding, or migratory activity or attempt to engage in any such conduct, or to assist such conduct,
- for plants – "to collect, pick, kill, transplant, cut or process or attempt to engage or to assist in any such conduct."

The Director of the MNHESP may issue a Conservation Permit if the proponent demonstrates that:

- impacts are avoided, minimized and mitigated to the extent practicable,
- an insignificant portion of the local population will be impacted (or that no viable alternative exists),
- A conservation plan will be carried out that provides a long-term net benefit to the conservation of the local population.

A Conservation Permit from DFW will be required to mitigate for the "taking" of three state-listed species (blue-spotted salamander, spotted turtle, and Hessel's hairstreak). The MBTA is committed to mitigating for losses to rare species habitat, and will develop a comprehensive Conservation Permit further in the design process. Potential elements of the multi-species Conservation Permit include habitat acquisition; habitat restoration and enhancement; maintaining and creating protected access through the railroad berm; support of state-wide research programs or inventory or protection programs targeted at these species; or biological inventory in the Hockomock Swamp.

Spotted Turtles

The proposed Stoughton Branch would result in the loss of upland rail berm currently used for nesting habitat, and would therefore be considered a "taking" of this state-listed species. This impact is unavoidable. Elements of a Conservation Plan for spotted turtles would include:

- Use of drift fences and monitoring to prevent animals from entering the construction area,
- Scheduling construction to avoid impacts to turtle nests
- Constructing and maintaining an equivalent area of replacement nesting habitat available to the same local population
- Constructing, monitoring and maintaining underpasses to provide enhanced connection across the berm
- Conducting a scientific inventory of the local population to determine the size, age structure, genetic structure, and area occupied by the local population
- Identification and acquisition of currently unprotected essential habitat for the local population, or other populations determined by NHESP to be at risk
- Contribution toward a state-wide inventory and protection program

Blue-Spotted Salamander

The proposed Stoughton Branch would result in the interruption of a migratory corridor, and would therefore be considered a "taking" of this state-listed species. This impact is unavoidable. Elements of a Conservation Plan for blue-spotted salamanders would include:

- Use of drift fences and monitoring to prevent animals from entering the construction area,
- Scheduling construction to avoid impacts during reproductive migration
- Constructing, monitoring and maintaining underpasses to provide enhanced connection across the berm
- Conducting a scientific inventory of the local population to determine the size, age structure, and area occupied by the local population
- Identification and acquisition of currently unprotected essential habitat for the local population, or other populations determined by NHESP to be at risk
- Contribution toward a state-wide inventory and protection program

Hessel's Hairstreak

The proposed Stoughton Branch would result in the loss of trees currently used for reproductive habitat, and would therefore be considered a "taking" of this state-listed species. This impact is unavoidable. Elements of a Conservation Plan for Hessel's Hairstreak would include:

- Scheduling construction to avoid impacts during larval development and pupation
- Conducting a scientific inventory of the local population to determine the size, reproductive success and area occupied by the local population
- Enhancing the ability of Pine Swamp and the Hockomock Swamp to provide habitat by planting Atlantic White Cedar (and/or transplanting small trees currently growing on the berm) to suitable areas within these habitats.
- Identification and acquisition of currently unprotected essential habitat for the local population, or other populations determined by NHESP to be at risk
- Contribution toward a state-wide inventory and protection program

4.3.4.3 Massachusetts Wetlands Protection Act

The Wetlands Protection Act Regulations (310 CMR 10.00 *et seq.*) (WPA) state that proposed projects that alter estimated rare wildlife habitat shall not be permitted to have any short-term or long-term adverse effects on the habitat of the local population of that species. The regulations only apply to proposed projects that would alter the habitat of a rare species occurring in a wetland resource area for which an occurrence has been entered into the official MNHESP database. Rare plants are not regulated under the Wetlands Protection Act. The MNHESP maintains an atlas of state-listed rare wildlife Estimated Habitat, which it updates every two years (most recently in 1997).

The DEP delegates regulatory authority to the local conservation commission to ensure compliance with the WPA. If work is proposed within Estimated Habitat, a Notice of Intent for a proposed project must be submitted to MNHESP concurrent with the conservation commission submittal. The written opinion of MNHESP on whether a project will have an adverse effect on rare species habitat shall be presumed to be correct by the conservation commission.

DEP Wetlands Program Policy 90-2 clarified the WPA. It states that the applicant shall have the burden of demonstrating that any proposed alteration will not adversely affect the habitat of the local population of the species by:

- identifying the relevant habitat requirements of the rare species;
- identifying the habitat characteristics of the resource areas and the important wildlife functions provided for that rare species; and
- demonstrating that the proposed work will not alter any habitat characteristics that are providing important wildlife functions for the rare species.

The proposed project will result in the loss of habitat for two state-listed species (*i.e.,* nesting habitat for spotted turtles, and egg-laying and pupae development habitat for Hessel's hairstreak), and would interrupt a migratory corridor reportedly used by blue-spotted salamanders. These impacts are unavoidable, and will require that the project obtain a Variance from strict compliance with the Massachusetts Wetlands Protection Act Regulations. During the Variance process, the MBTA will develop detailed information on the habitat characteristics and the local populations that would be affected, and will determine the likely short- and long-term effects on the local populations of these species. In conjunction with the application for a Conservation Permit, the MBTA will develop Conservation Plans to mitigate for impacts to the local population, and to provide a long-term net benefit to these species.

4.3.4.4 Agency Consultation

The Natural Heritage Program has provided information and input concerning rare species and potential impacts to biological diversity. Federal and state regulators have also met with the MBTA during the design process. On July 1, 1999 a site walk through the Hockomock Swamp was held with representatives from the EPA, the USFWS, DEP, MNHESP, and the Inland ACEC Program. The MBTA will continue to work with these regulatory agencies to address their concerns and design the project to minimize impacts to rare species and other biological resources along the project alignment.

4.3.4.5 Summary

The MBTA's New Bedford/Fall River Commuter Rail Extension, using the Stoughton Alternative, is likely to result in the loss of nesting, breeding, or migratory habitat for 3 state-listed rare wildlife species, and will require that the MBTA develop a comprehensive Conservation Plan that will provide a long-term benefit to these species. The restoration of commuter rail service along the Stoughton Branch or the Attleboro Bypass is likely to result in minor impacts to biological diversity by creating a barrier to the movement of small mammal, amphibian, or reptile movement and by decreasing forested habitat values directly adjacent to the railroad.

4.4 Area of Critical Environmental Concern/ Public Open Space

This section examines the potential impacts to the Hockomock Swamp ACEC and other public open space lands located along the Stoughton Alternative. One of these areas (the ACEC) is located on the Stoughton Branch. The other two (the Freetown/Fall River State Forest and the Acushnet Cedar Swamp State Reservation) are located on the Fall River Secondary and New Bedford Main Line, respectively, and would be potentially affected by any of the alternatives. Figures 2.3-1 and 2.3-2 show the locations of these areas.

4.4.1 Hockomock Swamp ACEC

The Hockomock Swamp Area of Critical Environmental Concern (ACEC) includes approximately 16,800 acres of land in Bridgewater, Easton, Norton, Raynham, Taunton, and West Bridgewater (Figure 4.4-1). This wetland system, which includes the Hockomock Swamp, the Dead Swamp, the Titicut Swamp, and the Little Cedar Swamp, is described by DEM as the largest vegetated freshwater wetland system in Massachusetts. These wetlands serve as the headwaters of the Town River, a tributary of the Taunton River, and overlay a system of high and medium yield aquifers that supply public drinking water wells in Raynham and West Bridgewater. The ACEC provides habitat for at least 13 species listed as rare, endangered, or of special concern by the Natural Heritage and Endangered Species Program. The atlantic white cedar swamp and acidic fen wetland communities scattered throughout the ACEC are described as "outstanding examples of these rare wetland types". Portions of the ACEC are used for public recreation. In addition to the undeveloped wetlands and uplands, segments of Route 138, I-495, Foundry Street (Route 106) and other major roadways are located within the ACEC.

Although much of the Hockomock Swamp portion of the ACEC is owned by the Department of Environmental Management as the Hockomock Swamp Wildlife Management Area, the MBTA has continued to own the railroad right-of-way through the ACEC from Route 123 in Easton to I-495 in Raynham.

The use of the Stoughton Branch for commuter rail service will require that the existing rail bed through the Hockomock Swamp ACEC be upgraded. As described in Chapter 2 of this DEIR, new ballast, ties, and track will be installed. Bridges will be rehabilitated or replaced as needed, and culverts may be replaced. The project will result in the loss of approximately 0.6 acres of Bordering Vegetated Wetland and 1600 linear feet of Bank, located within the ACEC limits south of the Raynham – Taunton Greyhound Park. This intermittent stream currently flows on the former railbed, as a result of blocked drainage, and has developed a wetland shrub community over the 30 years since rail service was discontinued. The New Bedford/Fall River Commuter Rail project will relocate this stream to a new channel adjacent to the tracks, with no permanent loss of Bank or wetland vegetation.

As described in Section 4.3 of this DEIR, reconstruction of the tracks and railbed may also result in indirect impacts to the fauna of the Hockomock Swamp ACEC, by reducing the ability of wildlife species, including state-listed rare species, to cross the rail bed; resulting in the loss of nesting habitat for state-listed turtle species; interrupting the forest canopy and creating new "edges" that may affect forest interior habitat; and by noise impacts along the rail corridor. The loss of migratory corridors and turtle nesting habitat are impacts that could be mitigated by the construction of tunnels beneath the rail line, and by constructing new areas of suitable turtle nesting substrate along the rail bed.

4.4.2 Freetown - Fall River State Forest

The Freetown – Fall River State Forest is a 5,441-acre property with access from Slab Bridge Road in Freetown. The State Forest provides recreational facilities, including a picnic area and 50 miles of unpaved roads and trails used for hiking, mountain biking, horseback riding, and snowmobiling. Hunting and fishing are also popular uses of the State Forest, particularly Rattlesnake Brook which is stocked with brook trout.

The Freetown – Fall River State Forest abuts the existing Fall River Secondary in Freetown. None of the active public recreation areas or trails are adjacent to the tracks, which are currently used for freight rail service.

The proposed upgrade of the railbed, track and signals, and use of the Fall River Secondary for commuter rail service, is not anticipated to result in any new adverse impacts on the Freetown – Fall River State Forest. All work will occur within the existing CSX freight railbed, and will not result in any alteration of wetlands or lands within the State Forest. Replacement of the existing rail with continuous welded rail will reduce noise impacts adjacent to the tracks. The MBTA will adhere to the approved Vegetation Management Plan, as implemented with its Yearly Operating Plans, which restrict the use of herbicides in areas adjacent to wetlands or sensitive resources.

4.4.3 Acushnet Cedar Swamp State Reservation

The Acushnet Cedar Swamp State Reservation is located in New Bedford and Dartmouth, north of the New Bedford Airport. The approximately 1,000-acre property includes an outstanding example of an Atlantic White Cedar swamp and provides habitat for state-listed rare wetlands wildlife and other state-listed rare, endangered, or special concern species. This is one of the 8 cedar swamps in public ownership in Massachusetts, and has been designated as a National Natural Landmark[42]. The existing New Bedford Main Line, currently used for freight rail service, forms the eastern boundary of the State Reservation.

The proposed upgrade of the railbed, track and signals, and use of the New Bedford Main Line for commuter rail service, is not anticipated to result in any new adverse impacts on the Acushnet Cedar Swamp Reservation. All work will occur within the existing CSX freight railbed, and will not result in any alteration of wetlands or lands within the State Reservation. Replacement of the existing rail with continuous welded rail will reduce noise impacts adjacent to the tracks. The MBTA will adhere to the approved Vegetation Management Plan, as implemented with its Yearly Operating Plans, which restrict the use of herbicides in areas adjacent to wetlands or sensitive resources.

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[42] Sorrie, Bruce A. and Henry L. Woolsey, 1987. The Status and Distribution of Atlantic White Cedar in Massachusetts. In A. Laderman, Atlantic White Cedar Wetlands, Westview Press. Pp. 135-142.

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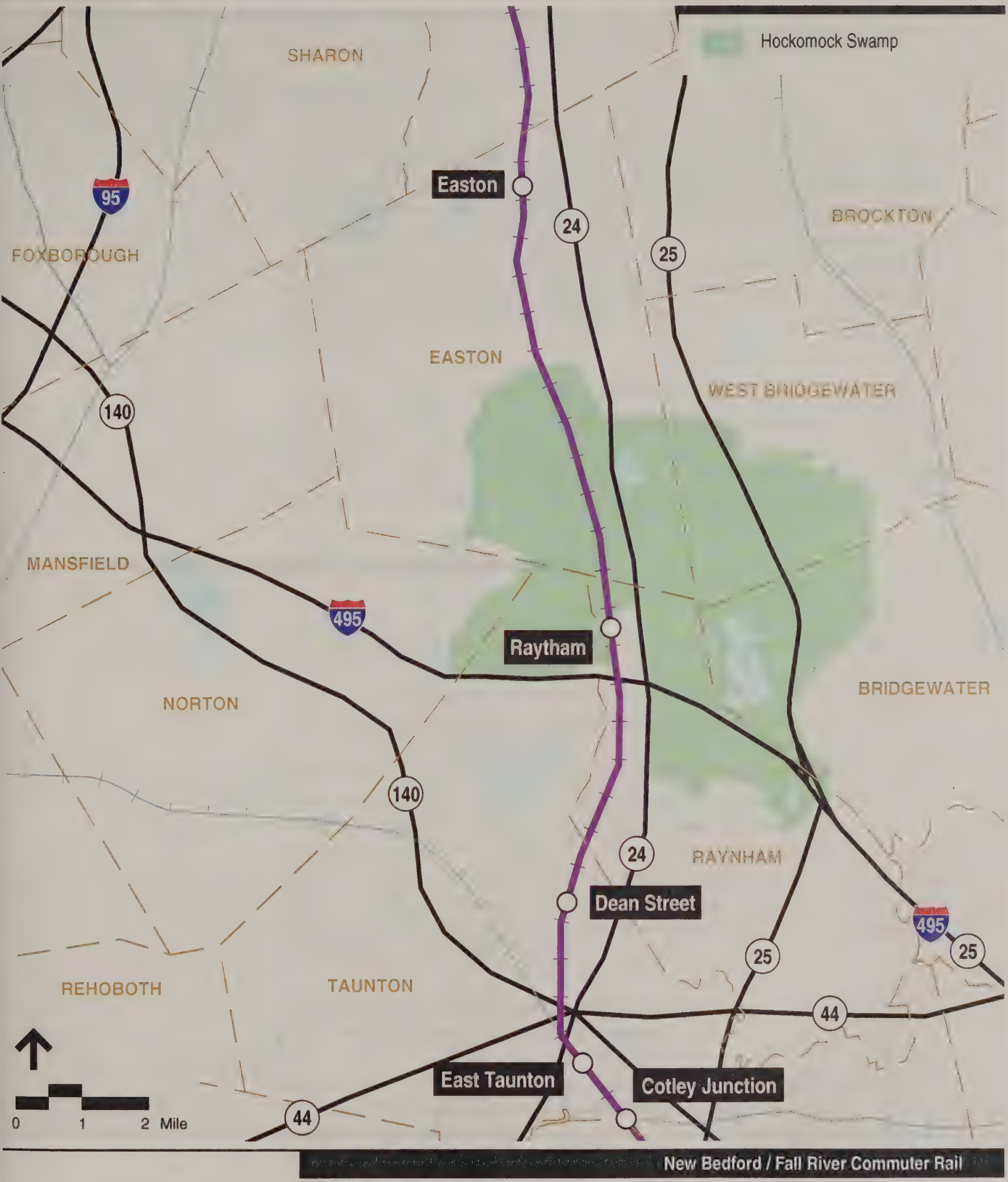

Hockomock Swamp ACEC

Figure 4.4-1

Massachusetts
Bay
Transportation
Authority

4.4.4 Summary

The New Bedford/Fall River Commuter Rail extension is not anticipated to affect the use or other properties of the Freetown – Fall River State Forest or the Acushnet Cedar Swamp State Reservation. In both areas, this project will upgrade existing track infrastructure and increase train traffic, but will not result in the loss or change of any resource, and will not create adverse noise impacts on public open space users. These two properties are adjacent to existing freight rail lines that would be upgraded to allow commuter rail service for all of the rail alternatives under consideration.

Reconstruction of the railbed and subsequent commuter rail operations in the Hockomock Swamp ACEC will result in the minor loss of wetland resources in one location, which would be fully replaced with no loss of area or function. The Stoughton Alternative would be likely to result in the loss of rare wetlands wildlife habitat, and would have indirect effects on wildlife habitat within the swamp.

4.5 Traffic

This section presents the analysis of traffic impacts associated with the Stoughton Alignment for the New Bedford/Fall River project. This analysis includes a detailed study of the traffic impacts at each of the three commuter rail stations proposed as part of this alternative and the relocated Freetown station.[43] The traffic impacts generated by this proposed station are also studied in this section. Existing traffic conditions in the vicinity of each station are analyzed based on 1998 data, while future conditions are analyzed for 2010, both with and without the project. Where appropriate, mitigation measures have been proposed to maintain or achieve acceptable levels–of–service (LOS) at study area intersections. The analysis of the project also includes 26 highway–railroad grade crossings that would be affected by the project. Mitigation measures such as railroad crossing signals, gates, signage, advance pavement markings, and, in some cases, grade separation or closure are recommended to improve safety.

Supplemental data and analyses used to prepare this summary of station traffic and grade crossing impacts are available on request.

Detailed traffic studies and mitigation measures for the stations proposed for the Attleboro Alternative and that would also be developed for the Stoughton Alternative (East Taunton, Fall River and New Bedford) are discussed in detail in the ENF. There have been no changes to the development or traffic generation in the vicinity of these stations that would require additional analysis or modifications to the proposed mitigation measures.

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[43] Originally studied in the New Bedford/Fall River Commuter Rail Project Environmental Notification Form; prepared by Vanasse Hangen Brustlin, Inc.

4.5.1 Commuter Rail Stations

As currently proposed, three stations would be located along the Stoughton Alignment in North Easton, Raynham, and Taunton. The Freetown station (located on the Fall River Secondary and common to all alternatives) has been relocated to Ridge Hill Road since the previous study. Figure 2.3-2 shows the specific location of each of these stations. Existing traffic conditions were examined for each station site, including major roadways and key intersections. Future no–build conditions were projected from anticipated growth rates and the construction of any known projects in the vicinity of each station's study area. Future build conditions added traffic generated by the rail stations to the no–build volumes. The methodology used to conduct traffic analyses of existing and future conditions is summarized below. The individual sections present detailed inventories of existing and projected conditons, including roadway geometry, daily and peak hour traffic volumes, accident history, and evaluation of traffic operations in the study areas for each of the four commuter rail station sites.

4.5.1.1 Analysis Methodology

This section describes the criteria and procedures used to analyze and summarize existing traffic conditions. For each of the proposed station sites, the following are discussed:

- Existing Roadway and Intersection Inventory
- Existing Traffic Volume Summary
- Accident Analysis Summary
- Traffic Operations Analysis

Existing Roadway and Intersection Inventory

A comprehensive field inventory of major roadways and key intersections was completed for each commuter rail station study area. Field reconnaissance included an inventory of roadway geometry, observed vehicle speeds, signalization (where applicable), other traffic control, and nearby land uses.

Existing Traffic Volume Summary

Traffic volume data were collected within each of the study areas in May 1998 and included Automatic Traffic Recorder Counts (ATRs) and manual Turning Movement Counts (TMCs).[44] ATRs were collected along major roadways to provide an understanding of daily and peak hour traffic flows in the vicinity of each commuter rail station site. Three–hour TMCs were conducted at key intersections during the

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[44] Traffic count data for the proposed North Easton, Raynham, and Dean Street Stations were collected in May 1998. Traffic count data for the proposed Freetown Station was collected in June 1999.

weekday morning and evening commuter peak periods. The TMCs were then seasonally adjusted, balanced, and rounded to form the traffic volume networks used to evaluate existing traffic operations. All TMCs were conducted midweek (Tuesday through Thursday) to capture traffic count data that depict typical peak conditions.

To determine whether or not it was necessary to seasonally adjust the recorded traffic volumes, historical traffic count data from the Massachusetts Highway Department (MassHighway) were reviewed. Traffic count data were reviewed from MassHighway permanent count stations at the following locations:

- Stoughton, Route 24 south of Route 139
- Raynham, Route 24 north of Route 44
- Raynham, I–495 north of Route 24
- Raynham, I–495 south of Route 24
- Rehoboth, Route 24 north of Route 44
- Somerset, Route 138 south of Whetstone Road

Based on observed data from these locations, traffic volumes for May and June are generally 1 to 8 percent higher than the yearly average. Consequently, the actual traffic counts were not adjusted to reflect any seasonal difference in traffic volumes and therefore represent a slightly higher than average condition.

Accident Analysis Summary

In order to identify accident trends, historical accident data were obtained from MassHighway for the most recent three-year period available for Stoughton, Easton, Raynham, Taunton and Freetown. For each proposed station site, traffic accidents were compiled by roadway and key intersection. Specific accident criteria include year of incident, accident type, severity, weather, and time of day.

Traffic Operations Analysis

Roadway capacity analyses were conducted to assess the quality of traffic flow at key intersections within the study areas. These analyses are based upon the criteria established in the 1994 Highway Capacity Manual.[45]

Level–of–service (LOS) is the term used to denote the different operating conditions that occur on a roadway segment or at an intersection under various traffic volume loads. It is a qualitative measure of the effect of a number of factors including roadway geometry, speed, travel delay, freedom to maneuver, and safety. LOS provides an index to the operational qualities of a roadway segment or an intersection. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions.

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[45] Highway Capacity Manual, Special Report 209, Transportation Research Board, Washington, DC, 1994.

LOS designation is reported differently for signalized and unsignalized intersections. For signalized intersections, the analysis considers the operation of each lane or lane–group entering the intersection and the LOS designation is for overall conditions at the intersection. For unsignalized intersections, however, the analysis assumes that traffic on the mainline is not affected by traffic on the side streets. The LOS is only determined for left turns from the main street and all movements from the minor street. The overall LOS designation is for the most critical minor movement, which is most often the left–turn movement from the side street.

Signalized Intersection Procedures

Capacity at a signalized intersection is defined for lane groups rather than for approaches or the intersection as a whole. A lane group may be a single movement, a group of movements, or an entire approach, and is defined by the geometry of the intersection and the distribution of movements over the various lanes. Capacity of a lane group is calculated as the maximum rate of flow that may pass through the intersection under prevailing traffic, roadway, and signalization conditions. The rate of flow is generally measured or projected for a 15–minute period and capacity is stated in vehicles per hour. Capacity analysis of signalized intersections involves computing volume–to–capacity (v/c) ratios for each lane group, from which an overall intersection v/c ratio may be derived.

Generally, when two opposing flows are moving during the same signal phase, one of the lane groups will require more green time than the other to process all of its volume. This lane group is defined as the "critical" lane group for the subject signal phase. The concept of a critical v/c ratio is used to evaluate the intersection as a whole, considering only the critical lane groups or those with the greatest demand for green time. Thus, if the green time has not been appropriately allocated to the various approaches, it is possible to have an overall intersection v/c of less than 1.00 (under capacity) but still have individual movements saturated within the signal cycle.

The other major concept in signalized intersection analysis is level–of–service, which is an index used to grade intersection operations. Level–of–service is defined in terms of delay and ranges from LOS A (free–flow conditions) to LOS F (long delays). Delay represents a measure of driver discomfort, frustration, fuel consumption, and lost time. Specifically, level–of–service delay criteria are stated in terms of average stopped delay per vehicle during a peak 15–minute period. The criteria are represented in Table 4.5–1.

Table 4.5–1
Level–of–Service Criteria for Signalized Intersections

Level–of–service	Stopped Delay per Vehicle (sec) *
A	≤ 5.0
B	5.1 to 15.0
C	15.1 to 25.0
D	25.1 to 40.1
E	40.1 to 60.0
F	>60.0

Source: Highway Capacity Manual, Special Report 209; Transportation Research Board, Washington, DC, 1994.
* Average stopped delay per vehicle for a peak 15–minute period.

Delay is a complex measure that depends upon a number of variables such as quality of signal progression, cycle length, allocation of green time, and v/c ratio. Of all the factors cited, v/c ratios have the least effect on delay. Thus, for any given v/c ratio, a range of delay values (and, therefore, LOS) may result. Conversely, for a given level–of–service, the v/c ratio may lie anywhere within a broad range.

The base saturation flow rate used in the signalized intersection analysis model is 1,900 passenger cars per hour of green per lane. This value is adjusted for prevailing traffic conditions such as lane width, left turns, right turns, heavy vehicles, grades, parking, area type, bus blockage, and left–turn blockage.

Unsignalized Intersection Analysis Procedures

Level–of–service for unsignalized intersections is based on the assumption that major street traffic is not affected by minor street movements (i.e.; minor street traffic must wait for a gap in major street traffic). The capacity of the intersection to accommodate minor street movements is based on the amount of traffic on the major street and the configuration of the intersection. LOS is based on the average total delay, defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. This time includes the time required for the vehicle to travel from the last–in–queue position to the first–in–queue position. The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. Table 4.5–2 presents these criteria.

Table 4.5–2
Level–of–Service Criteria for Unsignalized Intersections

Level–of–service	Stopped Delay per Vehicle (sec) *
A	≤ 5.0
B	5.1 to 15.0
C	10.1 to 20.0
D	20.1 to 30.0
E	30.1 to 45.0
F	>45.0

Source: Highway Capacity Manual, Special Report 209; Transportation Research Board, Washington, DC, 1994.
Average stopped delay per vehicle for a peak 15–minute period.

Future Condition Methodology

This section details the criteria and procedures used to analyze and summarize future traffic conditions. For each of the proposed station sites, the following are discussed:

- No–Build Condition
- Build Condition
- Trip Generation
- Mode Split
- Trip Distribution
- Traffic Operations Analysis

No–Build Condition

Future no–build traffic volumes were developed for 2010 to reflect a ten–year planning horizon for the project. Independent of the proposed project, future no–build traffic volumes are assumed to include:

- Existing traffic
- New traffic resulting from general background traffic growth
- Proposed improvements to study area roadways and intersections

Available population projection data for the towns of Easton, Raynham and Freetown and the City of Taunton were reviewed to predict a rate at which traffic can be reasonably expected to grow between now and 2010. Each of these municipalities was contacted to identify potential developments and planned roadway improvement projects in the vicinity of the station sites.

Build Condition

2010 Build Condition traffic volumes were developed by adding anticipated station–generated traffic volumes to the 2010 No–Build traffic volumes. The following sections briefly describe the procedures used to develop station–generated traffic volumes.

Trip Generation

Traffic forecasts for proposed projects are generally determined by applying average trip generation rates published within the Institute of Transportation Engineers' (ITE) Trip Generation[46] manual. This reference publication, however, does not provide trip rates for commuter rail stations. For this project, traffic and parking demand were based upon ridership forecasts developed for the MBTA by the Central Transportation Planning Staff (CTPS).[47] CTPS developed these forecasts based on a number of variables such as observed commuter rail ridership in similar areas, magnitude of service to be provided, and future estimates of population and employment within the study area. All of these data were analyzed via a state–of–the–art urban travel demand model, which ultimately provided a future ridership estimate for the proposed service. For each of the stations analyzed, vehicle trip generation was estimated based on these 2010 ridership forecasts.

Mode Split

The following mode split assumptions were made in developing traffic volume estimates for each of the proposed stations from the CTPS ridership forecasts:

Bus/HOV—Potential feeder bus service was not accounted for in the analysis of any of the proposed stations. While it is possible that feeder routes or on–demand type services may be provided at some point in the future to these proposed stations, they were ignored to keep the analysis of traffic operations on surrounding roadways and intersections conservative. The only modes of arrivals assumed in this analysis are drive–and–park, pick–up and drop–off, and walk/bicycle.

Parked Vehicles— We assumed that 90 to 93 percent of all commuter rail riders at these stations would drive and park. A vehicle occupancy rate (VOR) of 1.1 rail passengers per vehicle was also assumed. Based on previous studies of MBTA Commuter Rail parking lots, we established that approximately 60 percent of all arrivals and departures occur during the morning and evening peak hours. Any arrival or departure of this mode type represents a single vehicle trip.

Pick–up/Drop–off—We assumed that 7 to 10 percent of all commuter rail riders at these stations would be dropped–off and picked–up. We assumed a VOR of 1.0 for all pickup/drop–off activity. Additionally, it was assumed that all of the pickup/drop–off activity will occur during the peak hours. A pickup/ drop–off vehicle represents two vehicle trips, one entering the station and one exiting the station.

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[46] Trip Generation, 6th Edition; Institute of Transportation Engineers, Washington, D.C.

[47] New Bedford/Fall River Commuter Rail Project; Expanded Alternatives Analysis; prepared by the Massachusetts Bay Transportation Authority and the Central Transportation Planning Staff; March 1997.

Walk Trips—The Dean Street stations was assumed to have a nominal amount of walk trips to the site due to their proximity to residential neighborhoods. The Raynham, North Easton and Freetown stations were assumed to have no walk trips because of their location.

Table 4.5–3 summarizes projected daily ridership, mode–split, and parking demand at each of the three stations based on data developed by CTPS. Daily ridership projections account for inbound trips only. We assumed that the travel mode on the outbound trip will mirror the inbound trip.

Table 4.5–3
2010 Ridership and Parking Demand

	Station			
Future Ridership Projections	**North Easton**	**Raynham**	**Dean Street**	**Freetown**
Total Inbound Person Trips	1,100	300	400	430
Mode Split:				
Walk Trips	0	0	10	0
Drive–and–Park[1]	1000	275	360	400
Pick–up/Drop–off[2]	90	25	30	30
Total Daily Vehicle Trips				
Parking Supply[3]	1,200	450	500	450

Source: New Bedford/Fall River Commuter Rail Project; Expanded Alternatives Analysis; prepared by the Massachusetts Bay Transportation Authority and the Central Transportation Planning Staff; March 1997.

[1] Drive and Park include a vehicles occupancy rate of 1.1 passengers per vehicle.

[2] Pick–up/Drop–off (Maximum rate assumes all inbound vehicles have a passenger occupancy rate of 1.0).

[3] The number of spaces to be striped when the stations are opened

Trip Distribution

Station-generated peak hour traffic for each station was distributed on the traffic networks based on study area–specific information. Directional distribution was based on the location of the station site in relation to the existing population and nearby employment/activity centers.

All station–generated traffic was assigned to its respective study area roadway network based on the trip distribution developed for each station. No adjustment was made to account for the fact that many of the station–generated trips are vehicles that are already currently on area roads. This is a very conservative approach to estimating future traffic conditions since many of these station–generated traffic volumes will represent diverted traffic, not new traffic.

Traffic Operations Analysis

Roadway capacity analyses were conducted to assess the quality of traffic flow at key intersections within the study area, based upon the criteria established in the 1994 Highway Capacity Manual[48]. These analyses were conducted for both 2010 No–Build and 2010 Build conditions for morning and evening peak hour traffic volumes.

4.5.1.2 North Easton Station

The North Easton station will serve as an intermediate stop along the New Bedford/Fall River Line approximately three miles south of the existing Stoughton commuter rail station. The proposed station site is located west of Route 138 behind the existing Route 138 Motel between Union Street and the Stoughton/Easton Town Line. Adjacent land uses include the existing motel and several residential and small commercial uses along Route 138. This proposed station would primarily serve residents in Easton and south Stoughton. These travelers would access the site via local streets to Route 138.

The proposed North Easton station has been designed to serve the anticipated rail service with parking provided for 1,200 vehicles. Separate access will be provided for pick–up/drop–off activity. The pick–up/drop–off area has been designed to accommodate feeder bus service, although no such service is currently planned.

1998 Existing Condition

Inventory of Roadways and Intersections

This section provides a description of major roadways and key intersections within the vicinity of the proposed North Easton Commuter Rail Station site.

Roadways

- ***Route 138.*** Route 138 (Washington Street) is a state–owned two–lane roadway in the vicinity of the proposed site. Within the project study area, Route 138 extends in a north–south direction from Stoughton to Taunton. The roadway generally provides one fifteen foot travel lane in each direction with four to six foot wide shoulders on each side of the roadway. Land uses along Route 138 are primarily small to medium sized (under 50,000 gross square feet) and include commercial, retail, and industrial uses. There are also some older residential parcels scattered along the corridor and in small subdivisions with direct access to the road. Route 138 will provide the only direct access to the site.

- ***Union Street.*** Union Street is a town-owned two–lane roadway. It extends in an east–west direction from North Pearl Street (Brockton) in the east to Route 138 in the west. The roadway generally provides one 12–foot travel lane in each

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[48] Highway Capacity Manual, Special Report 209, Transportation Research Board, Washington, DC, 1994.

direction and serves as a secondary connector road for Easton residents who access Route 24. Land uses along Union Street are primarily residential.

- ***Elm Street.*** Elm Street is a town owned two–lane roadway that extends in an east–west direction from North Pearl Street (Brockton) in the east, across Route 138, and terminates at Canton Street, just north of North Easton Center. The roadway has one 12–foot travel lane in each direction and also serves as a secondary connector road to Route 24. Land uses along Elm Street are also primarily residential, although there are some commercial uses near Route 138.

Intersections

- ***Route 138 at Union Street.*** Route 138 and Union Street intersect to form a three-way T–intersection. This intersection is unsignalized with STOP–sign control on the Union Street westbound approach. All three approaches at the intersection have one shared, multi–purpose lane. Vehicle speeds along Route 138 near the intersection were observed to be approximately 40 to 45 miles per hour (mph). Adjacent land uses include small commercial and residential uses.

- ***Route 138 at Elm Street.*** Route 138 and Elm Street intersect to form a four–way intersection, although the Elm Street approaches on either side of Route 138 are offset by approximately 20 feet. The intersection is unsignalized with STOP–sign control on both Elm Street approaches. All four approaches have one shared, multi–purpose lane for all turning movements. Vehicle speeds along Route 138 near the intersection were observed to be approximately 40 mph. Adjacent land uses include commercial and residential uses and a cemetery.

- ***Route 138 at Main Street.*** Route 138 at Main Street is four–way signalized intersection. The two Route 138 approaches provide two lanes that serve as left–through and through–right lanes. The Main Street eastbound approach is 18 feet wide and is striped as one travel lane that effectively operates as two general purpose lanes. The Main Street westbound approach is 16 feet wide and is striped as one travel lane. Adjacent land uses include the North Easton Village Shops (a large retail plaza), Stonehill College, and some other smaller retail uses. The intersection is currently being reconfigured to provide additional width on the minor street approaches for formal turning lanes and upgraded signalization.

- ***Route 138 at Belmont Street (Route 123).*** Route 138 at Belmont Street is a four-way signalized intersection. The Route 138 southbound approach provides two lanes that serve as left–through and through–right lanes. The Route 138 northbound approach has three lanes, including an exclusive left–turn lane (into CVS pharmacy), a through lane, and a "free" right–turn lane onto Belmont Street. The Belmont Street approach is 18 feet wide and is striped as one travel lane that effectively operates as two general purpose lanes. The fourth leg of the intersection is the primary site drive to a CVS and local bank and has two lanes, a left–through lane and a through–right lane. Land uses adjacent to the intersection are primarily commercial in nature.

- ***Union Street at Sumner Street.*** The intersection of Union Street and Sumner Street is a local unsignalized T–intersection with STOP–sign control on Sumner Street. Each approach is approximately 12 feet wide and serves as a general purpose lane for all possible turning movements. Prevailing vehicle speeds on Union Street in the vicinity of the intersection are approximately 30 to 35 mph. Land uses in the area are residential.

Existing Traffic Volumes

Traffic volume data for the North Easton Station study area were collected in May 1998 and included Automatic Traffic Recorder Counts (ATRs) and Manual Turning Movement Counts (TMCs). For the North Easton Station Study Area, ATR data were collected at the following locations:

- Route 138 north of Union Street
- Union Street east of Route 138
- Elm Street east of Route 138

All of these locations are in the Town of Easton. Table 4.5–4 presents a summary of the recorded ATR volumes on a daily basis and during peak periods.

Table 4.5–4
Existing Traffic Volume Summary: North Easton Station Study Area

			Morning Peak Hour			Evening Peak Hour		
Location	Direction	ADT*	Volume	K Factor	Directional Distribution	Volume	K Factor	Directional Distribution
Route 138 north of Union Street	Northbound	7,300	680	9.3	62%	510	6.9	39%
	Southbound	7,300	420	5.7	38	800	11.0	61
	Total	14,600	1,100	7.5	100	1,310	8.9	100
Union Street east of Route 138	Eastbound	3,500	320	9.1	67%	280	8.0	45%
	Westbound	3,400	160	4.7	33	340	10.0	55
	Total	6,900	480	7.0	100	620	9.0	100
Elm Street east of Route 138	Eastbound	950	90	9.5	69%	70	7.4	50%
	Westbound	750	40	5.3	31	70	9.3	50
	Total	1,700	130	8.4	100	140	8.2	100

Source: Vanasse Hangen Brustlin, Inc. Based on automatic traffic recorder counts conducted May 1998.
* ADT – Average Daily Traffic volume expressed in vehicles per day.
** K–Factor represents the percent of daily traffic which occurs during the peak hour.
*** Directional distribution of peak hour traffic.

As presented in Table 4.5–4, Route 138 in the vicinity of the proposed North Easton station site carries approximately 14,600 vehicles per day (vpd) on a typical weekday with approximately 1,100 vehicles during the weekday morning peak hour and 1,300 vehicles during the weekday evening peak hour. Union Street acts as a secondary collector roadway with nearly 7,000 vpd traveling on it and 480 and 620 vph, respectively, during the morning and evening commuter peak hours. Elm Street east of Route 138 is a local roadway that handles only about 1,700 vpd.

Turning Movement Counts (TMCs) were collected during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods at each of the five study area intersections. These observed volumes were reviewed, balanced, and rounded to the nearest five to develop the traffic volume networks used to evaluate existing traffic operations. Peak hour traffic flow networks for 1998 Existing Condition weekday morning and evening peak hours are shown in Figure 4.5-1. A summary of raw ATR and TMC data are included in the Supplemental Information.

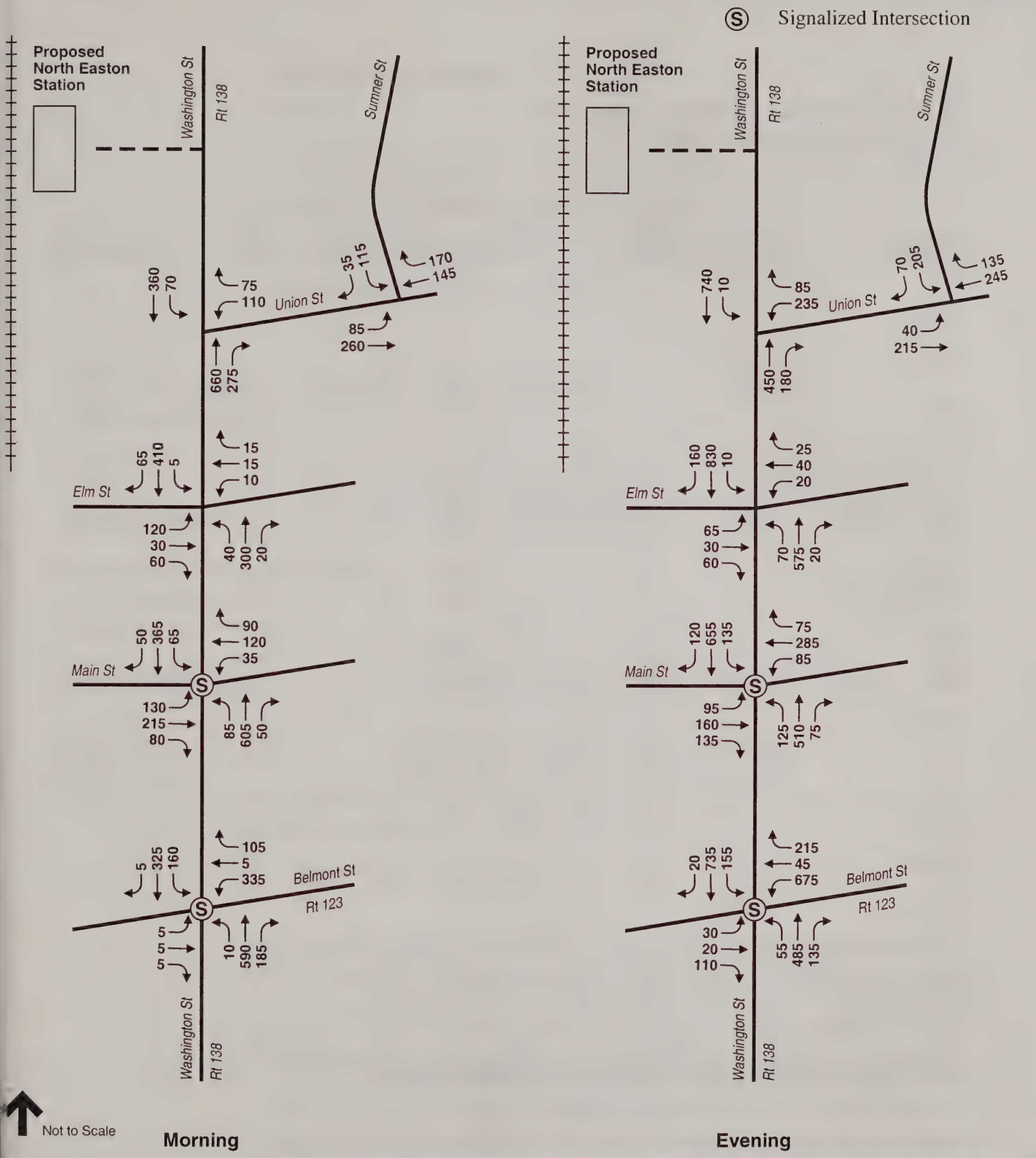
Accident Analysis Summary

In order to identify accident trends in the study area, accident data for the study area intersections were obtained from MassHighway for the most recent three–year period available (1995–1997). A summary of the accident data is provided in Table 4.5–5.

As shown in Table 4.5–5, 116 total accidents occurred within the study area over the three year period from 1995 to 1997, or approximately 39 accidents per year. A brief summary of the accident data is provided below:

- Most of the accidents that occurred in the study area were either angle or rear–end incidents and appear to be fairly evenly distributed at the four intersections along Route 138. These accidents occurred at all times during the day except late evening, when no incidents were reported.
- There were no traffic accidents reported at the intersection of Union Street and Sumner Street.
- Nearly two–thirds of all accidents involved only property damage (no personal injury).
- There was one fatality in the study area. It occurred at the intersection of Route 138 and Union Street.

A breakdown of this traffic accident summary is included in the Supplemental Information.



New Bedford / Fall River Commuter Rail

North Easton Station
1998 Existing Peak Hour
Traffic Volumes

Figure 4.5-1

Table 4.5–5
Intersection Accident Summary — 1995 to 1997
North Easton Station Study Area

		Route 138 at				
Scenario	Total	Union Street	Elm Street	Main Street/ Torrey Street	Belmont Street	Union Street at Sumner Street
Year						
1995	42	7	6	16	13	0
1996	36	12	13	1	10	0
1997	38	7	5	12	14	0
Total	116	26	24	29	37	0
Type						
Angle	87	20	20	17	30	0
Rear–end	11	1	2	5	3	0
Head–on	2	2	0	0	0	0
Unknown–Other	16	3	2	7	4	0
Total	116	26	24	29	37	0
Severity						
Property Damage Only	74	16	12	19	27	0
Personal Injury	39	9	12	9	9	0
Fatality	1	1	0	0	0	0
Other	2	0	0	1	1	0
Total	116	26	24	29	37	0
Weather						
Clear	69	11	15	19	24	0
Cloudy	26	6	5	7	8	0
Rain	9	4	1	3	1	0
Snow	8	4	3	0	1	0
Fog	3	1	0	0	2	0
Unknown	1	0	0	0	1	0
Total	116	26	24	29	37	0
Time						
7:00 AM to 9:00 AM	15	4	2	4	5	0
9:00 AM to 4:00 PM	51	10	11	15	15	0
4:00 PM to 6:00 PM	28	7	9	4	8	0
6:00 PM to 7:00 AM	22	5	2	6	9	0
Total	116	26	24	29	37	0

Source: Compiled by Vanasse Hangen Brustlin, (VHB) Inc. from the Massachusetts Highway Department.

Traffic Operations Analysis Summary

An analysis of the existing conditions in the vicinity of the North Easton Station site was performed to assess the ability of intersections to process traffic associated with the proposed commuter rail station. Under existing conditions, three of the study area intersections are unsignalized and two are signalized. The results of the analyses for these intersections for 1998 Existing conditions around the proposed North Easton Station are presented in Table 4.5–6.

Table 4.5–6
Level–of–Service Summary: North Easton Station Study Area
1998 Existing Conditions

	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
Signalized Intersection	V/C*	Delay	LOS***	V/C	Delay	LOS
Route 138 (Washington Street) @ Main Street	0.57	10	B	1.1	36	D
Route 138 (Washington Street) Route 123 (Belmont Street)	0.94	13	B	>1.2	NA	F
Unsignalized Intersections	Critical Movement	Delay	LOS	Critical Movement	Delay	LOS
Route 138/Union Street	WB Left	>45	F	WB Left	>45	F
Union Street/Sumner Street	SB Movements	10	B	SB Movements	13	C
Route 138/Elm Street	EB Movements	>45	F	EB Movements	>45	F

* Volume to capacity ratio.
** Average intersection delay expressed in seconds per vehicle.
*** Level–of–service.
NA Not applicable. Delay cannot be accurately calculated when V/C exceeds 1.2.

Several of the North Easton Station study area intersections currently operate at LOS F. Nearly all of the delay experienced at the unsignalized intersections is due to left–turning movements from the minor street to the major street. The delays are due primarily to the high through traffic volumes on Route 138 (Washington Street) throughout the study area, which result in insufficient gaps in the traffic stream. The signalized intersections within the North Easton Station study area appear to provide satisfactory LOS in the peak hours, with the exception of Route 138 (Washington Street) and Route 123 (Belmont Street), which operates at LOS F during the evening peak hour due to a high number of left–turn movements from Route 123 westbound to Route 138 southbound.

2010 No–Build Condition

In order to represent 2010 No–Build traffic volumes, a growth factor was applied to 1998 Existing Condition traffic volumes in the study area. To predict a reasonable growth rate by which traffic is likely to grow in the Easton area, population projections for the town were reviewed. These data indicate that the 1997 population for Easton was 22,137 and is predicted to grow to approximately 24,500 by 2010 (or at an annual growth rate of approximately 0.80 percent). The town of Easton was contacted to identify potential developments that could affect traffic conditions in the proximity of the proposed North Easton Station. Based on subsequent discussions, there appear to be no developments planned at this time that would further impact traffic operations in the vicinity of this proposed station. Additionally, roadway improvements are currently being constructed at the Route 138 at Main Street intersection and have been included in both the 2010 No-Build and 2010 Build condition. Subsequently, an annual growth rate of 1 percent was applied to the 1998 Existing Condition traffic volumes to produce 2010 No–Build Condition traffic volumes. The 2010 No–Build morning and evening peak hour traffic volumes are presented in Figure 4.5-2.

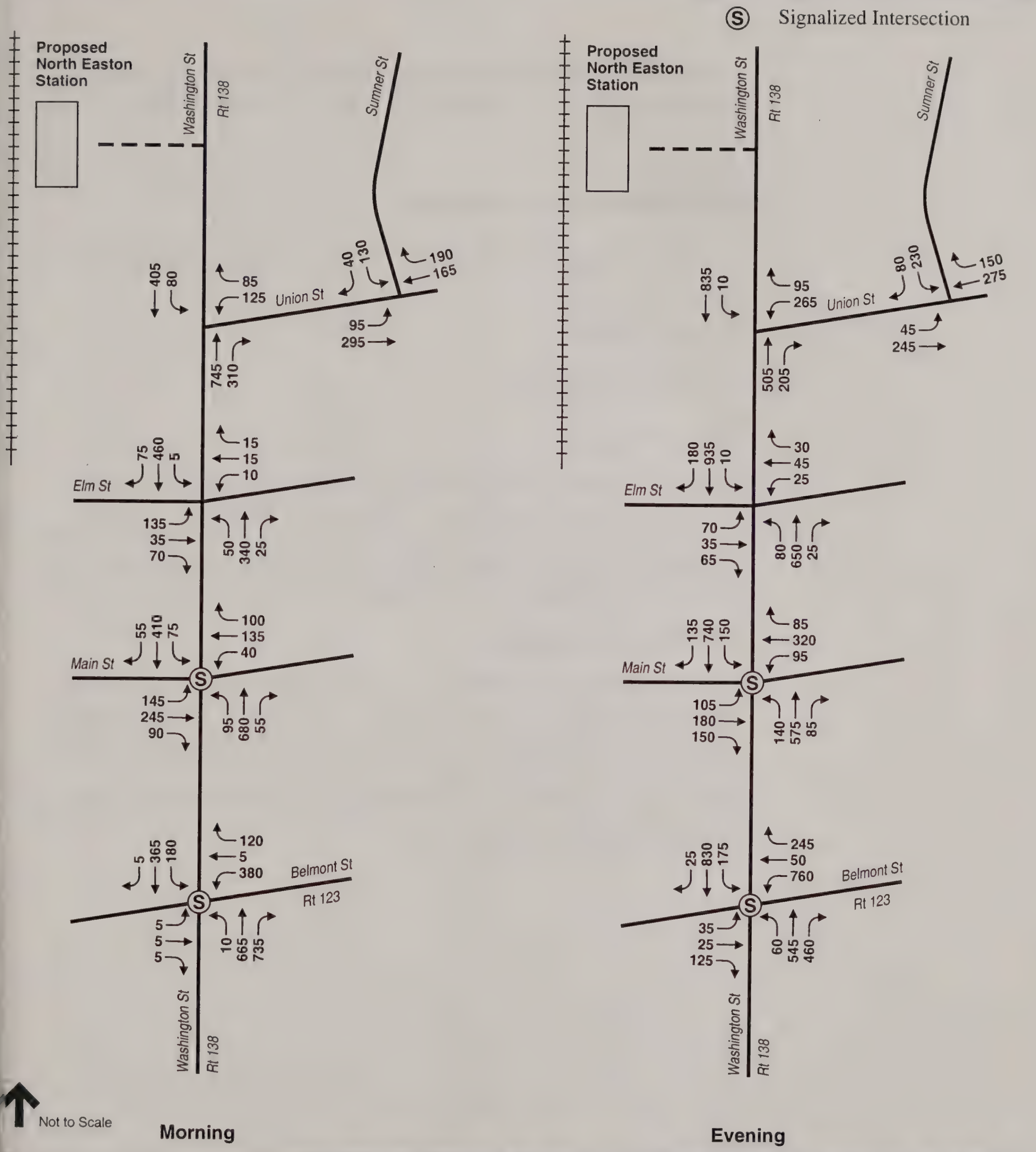
2010 Build Condition

2010 Build Condition traffic volumes were developed by adding anticipated station–generated traffic volumes to the 2010 No–Build Condition traffic volumes. Traffic forecasts for the proposed North Easton Station were based on ridership projections that were developed by CTPS. As stated in the Analysis Methodology section, approximately 60 percent of the arrivals occur during the morning peak hour and 60 percent of the departures occur during the evening peak hour. In order to provide a conservative analysis, all of the pickup/drop–off activity was assumed to occur during the peak hours. Trip generation for the North Easton Station is presented in Table 4.5–7.

Table 4.5–7
Trip Generation: North Easton Station

	Daily			Morning Peak Hour			Evening Peak Hour		
Movement	Park	Pick–up/ Drop–off	Total	Park	Pick–up/ Drop–off	Total	Park	Pick–up/ Drop–off	Total
In	909	180	1,089	546	90	636	91	90	181
Out	909	180	1,089	0	90	90	546	90	636
Total	1,818	360	2,178	546	180	726	637	180	817

These peak hour traffic volumes were then distributed and assigned to the study area roadway network based on the location of the proposed station in relation to the existing population and nearby employment/activity centers. Table 4.5–8



New Bedford / Fall River Commuter Rail

North Easton Station
2010 No Build Peak Hour
Traffic Volumes

Figure 4.5-2

summarizes the directional trip distribution that was applied to assign station–generated peak hour traffic volumes to the study area roadway network.

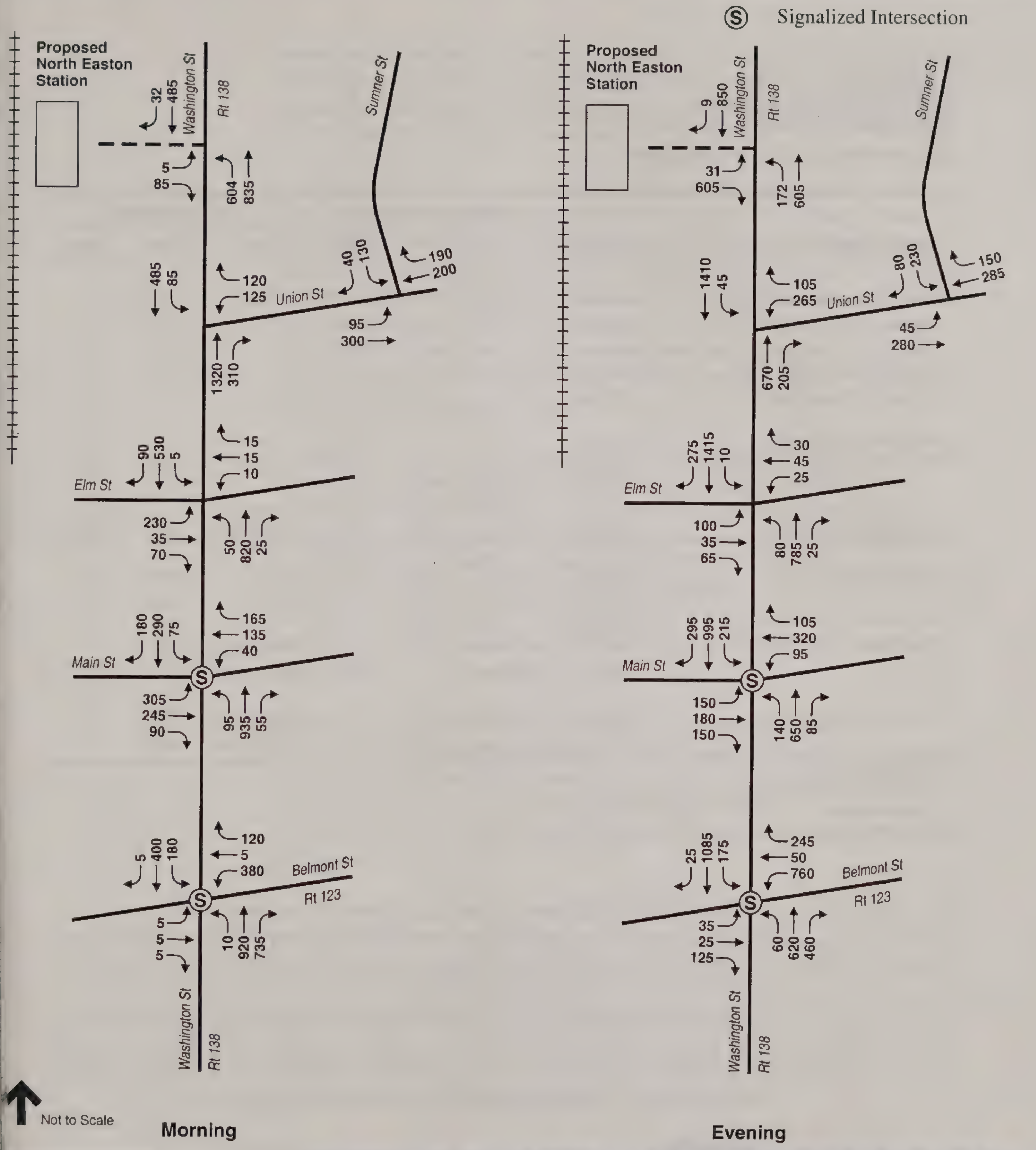
Table 4.5–8
Trip Distribution: North Easton Station

Origin	Percent Distribution
From North (Route 138)	5%
From South (Route 138)	40%
From East (Union Street/Main Street)	15%
From West (Main Street/Elm Street)	40%
Total	100%

It should be noted from Table 4.5–8 that approximately 80 percent of all station–generated traffic originates from points south and west along Route 138. Only approximately 5 percent of all station–generated traffic originates from points north along Route 138. These percentages were used to develop 2010 Build Condition morning and evening peak hour traffic volumes, which are presented in Figure 4.5-3.

Traffic Operations Analysis

Measuring existing traffic volumes and projecting future traffic volumes quantifies traffic flow within the study area. To assess the quality of flow, roadway capacity analyses were conducted for 2010 No–Build and Build traffic conditions. Capacity analyses provide an indication of how well the roadway facilities meet the traffic demands placed on them. The resulting signalized and unsignalized intersection level–of–service (LOS) analyses for both the 2010 No–Build Condition and 2010 Build Condition are summarized in Table 4.5–9.



North Easton Station
2010 Build Peak Hour
Traffic Volumes

Figure 4.5-3

Table 4.5–9
Level-of-Service Summary
North Easton Station Study Area
2010 No–Build and Build Conditions

		2010 No–Build Condition			2010 Build Condition		
Signalized Intersection	Peak Hour	V/C*	Delay	LOS***	V/C	Delay	LOS
Route 138 (Washington Street) at Main Stree/ Torrey Street	AM Peak	.43	9	B	.93	13	B
	PM Peak	.71	18	C	.86	22	C
Route 138 (Washington Street) at Route 123 (Belmont Street)	AM Peak	*	*	F	*	*	F
	PM Peak	*	*	F	*	*	F
Route 138 at Site Driveway	AM Peak	—	—	—	0.88	12	B
	PM Peak	—	—	—	1.01	35	D
Unsignalized Intersections	Peak Hour	Critical Movement	Delay	LOS	Critical Movement	Delay	LOS
Route 138/Union Street	AM Peak	WB Left	127	F	WB Left	>999	F
	PM Peak	WB Left	418	F	WB Left	>999	F
Union Street/Sumner Street	AM Peak	SB Movements	12	C	SB Movements	13	C
	PM Peak	SB Movements	18	C	SB Movements	21	D
Route 138/Elm Street	AM Peak	EB Movements	61	F	EB Movements	970	F
	PM Peak	EB Movements	990	F	EB Movements	>999	F

* Volume to capacity ratio.

** Average intersection delay expressed in seconds per vehicle.

*** Level–of–service.

NA Not applicable. Delay cannot be accurately calculated when V/C exceeds

Two of the signalized intersections in the North Easton Station study area intersections can be expected to operate at LOS F during peak periods under both 2010 No–Build and Build Conditions. Nearly all of the delay experienced at the unsignalized intersections is due to left–turning movements from the respective minor street onto Route 138. These delays appear primarily during peak traffic periods and affect only a small number of turning vehicles. The delays result from the high through traffic volumes on Route 138 throughout the study area during peak periods, which provide insufficient gaps in the traffic stream.

Mitigation

Mitigation measures were examined to determine if improvements were possible for the peak period operations for two signalized intersections along Route 138 (Washington Street) in North Easton; the Route 138 at Main Street intersection and the Route 138 at Route 123 intersection. Optimised signal phasing at these intersections, which are projected to operate at LOS F under both the No–Build and Build Conditions, will not adequately improve the level of service. Geometric changes such as adding a travel or turn lane would be required to improve the operating condition at these intersections.

The signalized intersection of Route 138 and Route 123 is projected to operate at LOS F under both the 2010 No-Build and Build Conditions. In order to improve operations at this intersection exclusive left-turn lanes will be needed along the Route 123 westbound approach and the Route 138 southbound approach. Roadway widening will be required along all four approaches in order to accommodate the improvements. In addition to the widening, an upgrade of the current signal equipment will be necessary to accommodate new signal phasing. With these mitigation measures in effect, the intersection is projected to operate at LOS C during the both the morning and evening peak hours.

Major reconstruction of the intersection would be required in order to improve the intersection of Route 138 at Main Street. All approaches except the eastbound approach would need to be widened to provide additional turning lanes. The westbound approach would need to be widened to provide an exclusive right-turn lane. The Route 138 northbound approach would need to be widened to provide an exclusive left turn lane. The Route 138 would require the largest widening in order to provide an exclusive right- and left-turn lane. The intersection operations will be improved to LOS C/D under No-Build and LOS C/E under Build conditions, respectively.

It is suggested that the Massachusetts Highway Department review these intersections for possible improvements. Major impacts to abutters, particularly on the Route 138 and Main Street intersection, will need to be considered. Should these improvements be desired, the MBTA could contribute to the construction/implemention of these intersection improvements based on their fair share of the impacts to these intersections.

There are two unsignalized intersections in North Easton that will operate at LOS F during the peak morning and evening hour. These intersections operate at LOS F under No-Build conditions and the station traffic adds to the already congested intersections. These delays appear to be a concern only during peak traffic periods. The Massachusetts Highway Department should review these intersections for possible signalization. Should these improvements be desired, the MBTA could contribute to the construction/implemention of these intersection improvements based on their fair share of the impacts to these intersections.

4.5.1.3 Raynham Station

The Raynham Station will also serve as an intermediate stop along the New Bedford/Fall River Line. It will be located approximately one and one–half miles south of Route 106 and two miles north of Interstate 495 on the west side of Route 138, behind the existing Raynham–Taunton Greyhound Park. The proposed station site is an area on the northwestern portion of the dog track parcel that is currently used to stockpile utility poles. Adjacent land uses include the dog track and a number of other industrial uses that lease space on the dog track parcel, including a trucking and construction company. This station would primarily serve residents in Taunton, Easton, and Raynham, who would access the site via Route 138. Regional access to the site is also possible via I–495.

The proposed Raynham Station has been designed to serve area comuter rail service demands with parking provided for 450 vehicles. As for the proposed North Easton Station, separate access will be provided for pick–up/drop–off activity (which has also been designed to accommodate potential future feeder bus service.

1998 Existing Condition

Inventory of Roadways and Intersections

This section provides a description of major roadways and key intersections within the vicinity of the proposed Raynham Commuter Rail Station.

Roadways

- *Route 138.* Route 138 (Broadway) is a state–owned two–lane roadway in the vicinity of the proposed site. Within the project study area, Route 138 extends in a north–south direction from Stoughton to Taunton. The roadway generally provides one 15–foot travel lane in each direction with 4 to 6 foot wide shoulders on each side of the roadway. Land uses along Route 138 include the Raynham–Taunton Greyhound Park as well as some other small commercial and industrial uses and residential property. Route 138 provides the only direct access to the site.

- *Interstate 495.* Interstate 495 (I–495) is part of the federal interstate highway system that is maintained by the Commonwealth of Massachusetts. I–495 is a six–lane, divided highway traversing eastern Massachusetts in a circumferential direction from Salisbury to Wareham. Access to the proposed site from I–495 is provided via an interchange with Route 138, approximately two miles south of the proposed site.

Intersections

- *Route 138 at Turnpike Street.* The intersection of Route 138 and Turnpike Street is a "skewed" unsignalized T–intersection with STOP–sign control on Turnpike Street. Each approach is approximately 12 feet wide and serves as a general purpose lane for all possible turning movements. Prevailing vehicle speeds on Route 138 in the vicinity of the intersection are approximately 40 to 45 miles per hour (mph). Land uses in the area are primarily commercial and industrial.

- ***Route 138 at Route 106 (Foundry Street).*** Route 138 at Route 106 (Foundry Street) is a four–way signalized intersection. The two Route 138 approaches provide two lanes that serve as left–through and through–right lanes. The Route 106 eastbound and westbound approaches are 23 feet wide and are striped as one travel lane that effectively operates as two general purpose lanes. Adjacent land uses include residential property and some smaller retail uses.

- ***Route 138 at Wilbur Street.*** The intersection of Route 138 and Wilbur Street is a local unsignalized T–intersection with STOP–sign control on Wilbur Street. Each approach is approximately 12 feet wide and serves as a general purpose lane for all turning movements. Prevailing vehicle speeds on Route 138 in the vicinity of the intersection are approximately 40 to 45 mph. Land uses in the area are residential.

- ***Route 138 at Elm Street.*** Route 138 at Elm Street is four–way signalized intersection. The two Route 138 approaches provide two lanes that serve as left–through and through–right lanes. The Elm Street eastbound approach is 14 feet wide and is striped as one general purpose travel lane. The Elm Street westbound approach is 23 feet wide and is striped as two lanes that serve as left–through and through–right lanes. Adjacent land uses include two commercial strip plazas and a bank.

- ***Route 138 at I–495 NB On– and Off–Ramps.*** The intersection of Route 138 and I-495 northbound on– and off–ramps is a four–way, median–divided unsignalized intersection with STOP–sign control on the I–495 off–ramp. The Route 138 southbound approach has three travel lanes. Two of these lanes are through lanes and the third is a deceleration/right–turn lane onto the I–495 northbound on–ramp. The Route 138 northbound approach also has three travel lanes, with two through lanes and a left–turn lane onto I–495 northbound. The I-495 northbound off–ramp has two approach lanes, a left–turn lane that is STOP–sign controlled and a free right–turn/acceleration lane. The I–495 northbound on–ramp also has two departure lanes, including a free right–turn/deceleration lane from Route 138 southbound and left–turn lane from Route 138 northbound.

- *Route 138 at I–495 SB On– and Off–Ramps.* The intersection of Route 138 and I-495 southbound on– and off–ramps is a four–way, median–divided unsignalized intersection with STOP–sign control on the I–495 off–ramp. The Route 138 northbound approach has three travel lanes. Two of these lanes are through lanes and the third is a deceleration/right–turn lane onto the I–495 southbound on–ramp. The Route 138 southbound approach also has three travel lanes, with two through lanes and a left–turn lane onto I–495 southbound. The I-495 southbound off–ramp has two approach lanes, a left–turn lane that is STOP–sign controlled and a free right–turn/acceleration lane. The I–495 southbound on–ramp also has two departure lanes, including a free right–turn/deceleration lane from Route 138 northbound and left–turn lane from Route 138 southbound.

- *Route 138 at Center Street.* Route 138 and Center Street intersect to form a three–way T–intersection. This intersection is signalized with one shared, multi–purpose lane for each approach. Vehicle speeds along Route 138 near the intersection were observed to be approximately 40 to 45 mph. Adjacent land uses include mostly small commercial and residential uses.

Existing Traffic Volumes

Traffic volume data for the Raynham Station study area were collected in May 1998 and included Automatic Traffic Recorder Counts (ATRs) and Manual Turning Movement Counts (TMCs). For the Raynham Station Study Area, ATR data were collected at Route 138 near the Raynham–Taunton Greyhound Park.

Table 4.5–10 presents a summary of the recorded ATR volumes on a daily basis and during peak periods.

Table 4.5–10
Existing Traffic Volume Summary: Raynham Station Study Area

			Morning Peak Hour			Evening Peak Hour		
Location	Direction	ADT*	Volume	K Factor	Directional Distribution	Volume	K Factor	Directional Distribution
Route 138 north of Dog Track	Northbound	9,400	960	10.2	71%	560	6.0	35%
	Southbound	9,600	400	4.1	29	1,040	10.8	65
	Total	19,000	1,360	7.2	100	1,600	8.4	100

Source: Vanasse Hangen Brustlin, Inc. Based on automatic traffic recorder counts conducted March 1998.

* ADT – Average Daily Traffic volume expressed in vehicles per day.

** K–Factor represents the percent of daily traffic which occurs during the peak hour.

*** Directional distribution of peak hour traffic.

As presented in Table 4.5–10, Route 138 in the vicinity of this proposed station site carries approximately 19,000 vehicles per day (vpd) on a typical weekday with approximately 1,360 vehicles during the weekday morning peak hour and 1,600 vehicles during the weekday evening peak hour.

The TMCs were collected during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods at each of the five study area intersections. These observed volumes were reviewed, balanced, and rounded to the nearest five to develop the traffic volume networks used to evaluate existing traffic operations. Peak hour traffic flow networks for an existing weekday morning and evening peak hour are shown in Figure 4.5-4. A summary of raw ATR and TMC data is included in the Supplemental Information.

Accident Analysis Summary

In order to identify accident trends in the study area, accident data for the study area intersections were obtained from MassHighway for the most recent three–year period available (1995–1997). A summary of the accident data is provided in Table 4.5–11.

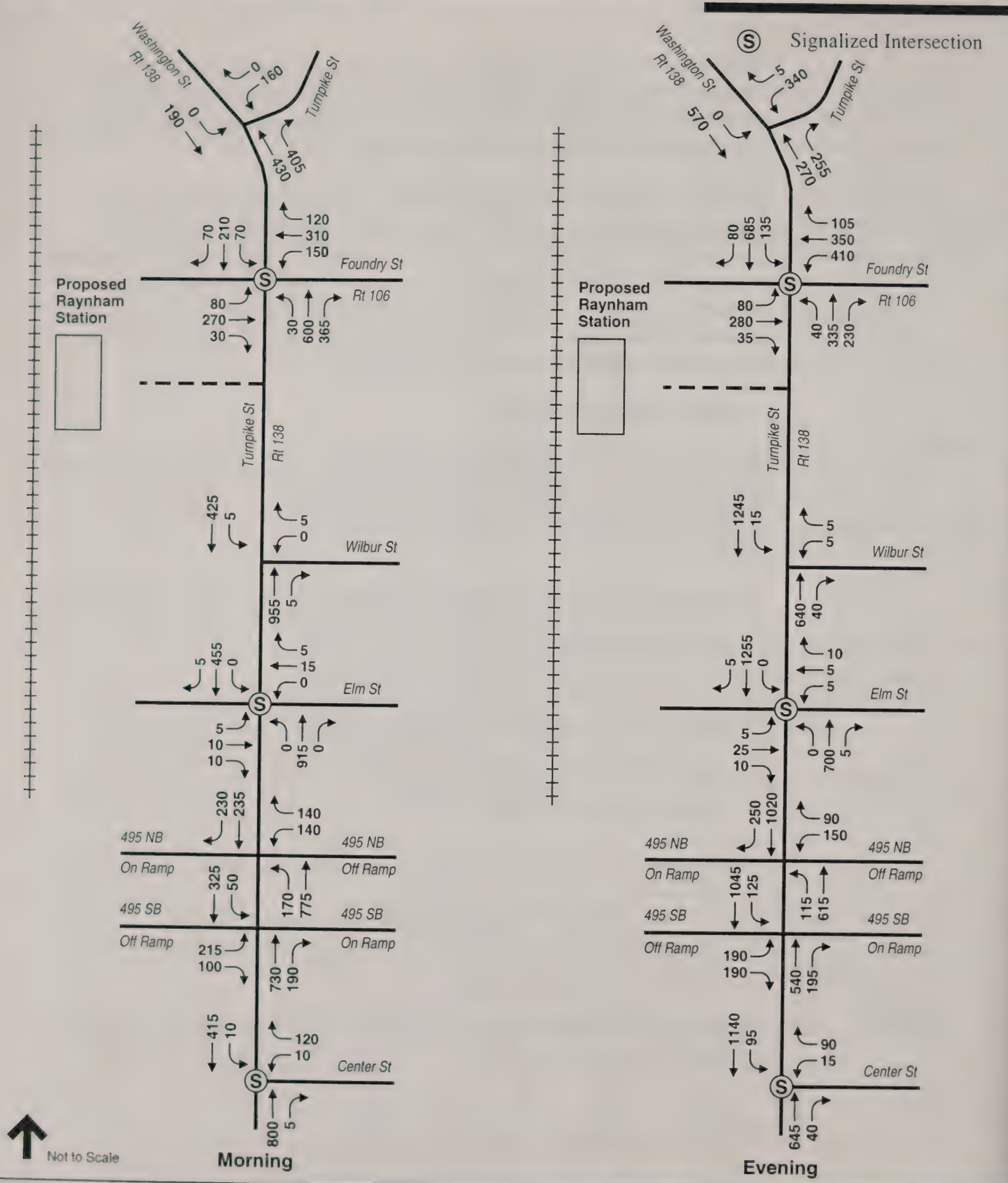
As shown in Table 4.5–11, 122 total accidents occurred within the study area over the three year period from 1995 to 1997, or approximately 40 accidents per year. A brief summary of the accident data is provided below:

- Most of the accidents that occurred in the study area were either angle or rear–end incidents. Most of the accidents reported were at Route 138 intersections with Turnpike Street, Route 106 (Foundry Street), and the I–495 Interchange. These accidents occurred at all times during the day except late evening, when no incidents were reported.

- There was only one traffic accident reported at the intersection of Route 138 and Wilbur Street.

- Sixty percent of all accidents involved only property damage (no personal injury).

- There was one fatality in the study area. It occurred at the intersection of Route 138 and Turnpike Street.



Raynham Station
1998 Existing Peak Hour
Traffic Volumes

Figure 4.5-4

Table 4.5–11
Intersection Accident Summary — 1995 to 1997
Raynham Station Study Area

		Route 138 at					
Scenario	Total	Turnpike Street	Rte. 106 (Foundry St.)	Wilbur Street	Elm Street	I–495 On–/Off–Ramps	Center Street
Year							
1995	40	8	19	0	4	7	2
1996	55	10	16	1	5	17	6
1997	27	7	5	0	4	7	4
Total	122	25	40	1	13	31	12
Type							
Angle	65	10	29	0	4	12	10
Rear–end	36	12	8	0	6	8	2
Head–on	5	1	1	0	1	2	0
Unknown–Other	16	2	2	1	2	9	0
Total	122	25	40	1	13	31	12
Severity							
Property Damage Only	73	15	22	1	6	21	8
Personal Injury	48	9	18	0	7	10	4
Fatality	1	1	0	0	0	0	0
Unknown	0	0	0	0	0	0	0
Total	122	25	40	1	13	31	12
Weather							
Clear	65	13	26	0	8	12	6
Cloudy	20	8	5	0	1	6	0
Rain	20	3	4	1	1	8	3
Snow	8	1	2	0	2	1	2
Fog	6	0	3	0	0	3	0
Unknown	3	0	0	0	1	1	1
Total	122	25	40	1	13	31	12
Time							
7:00 AM to 9:00 AM	17	1	15	0	0	1	0
9:00 AM to 4:00 PM	41	13	10	1	1	10	6
4:00 PM to 6:00 PM	29	5	10	0	2	6	6
6:00 PM to 7:00 AM	35	6	5	0	10	14	0
Other	0	0	0	0	0	0	0
Total	122	25	40	1	13	31	12

Source: Compiled by Vanasse Hangen Brustlin, (VHB) Inc. from the Massachusetts Highway Department.

Traffic Operations Analysis Summary

An analysis of the existing conditions in the vicinity of the Raynham Station was performed to assess the ability of intersections to process traffic. Under existing conditions, five of the Raynham Station study area intersections are unsignalized and two are signalized. The results of the analyses for these intersections for 1998 Existing conditions are presented in Table 4.5–12.

Table 4.5–12
Level – of – Service Summary: Raynham Station Study Area 1998 Existing Conditions

	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
Signalized Intersection	**V/C***	**Delay**	**LOS*** **	**V/C**	**Delay**	**LOS**
Route 138 (Turnpike Street) @ Route 106 (Foundry Street)	0.82	14	B	>1.2	NA	F
Route 138 (Broadway) at Elm Street	0.37	3	A	0.47	3	A

Unsignalized Intersections	**Critical Movement**	**Delay**	**LOS**	**Critical Movement**	**Delay**	**LOS**
Route 138 /Turnpike Street	WB Left	19	C	WB Left	>45	F
Route 138/Wilbur Street	WB Movements	8	B	WB Movements	29	D
Route 138/I–495 NB Ramps	WB Left	>45	F	NB Left	>45	F
Route 138/I–495 SB Ramps	EB Left	>45	F	EB Left	>45	F
Route 138/Center Street	WB Movements	7	B	WB Movements	24	D

* Volume to capacity ratio.
** Average intersection delay expressed in seconds per vehicle.
*** Level–of–service.
NA Not applicable. Delay cannot be accurately calculated when V/C exceeds 1.2.

Four of the study area intersections currently operate at LOS F in one or both of the peak hours analyzed. Most of the unsignalized intersections experience long delays in the evening peak hour for left–turning movements from the minor street to the major street. The delays are due primarily to the high through traffic volumes on Route 138 throughout the Raynham Station study area. The signalized intersection of Route 138 (Turnpike Street) and Route 106 (Foundry Street) currently operates at LOS B in the morning peak hour and LOS F in the evening peak hour. The level–of–service in the evening peak hour is affected by high left–turn volumes on the westbound Route 106 approach to the intersection. The intersection of Route 138 (Broadway) and Elm Street provides an acceptable LOS A in both the morning and evening peak hours.

2010 No–Build Condition

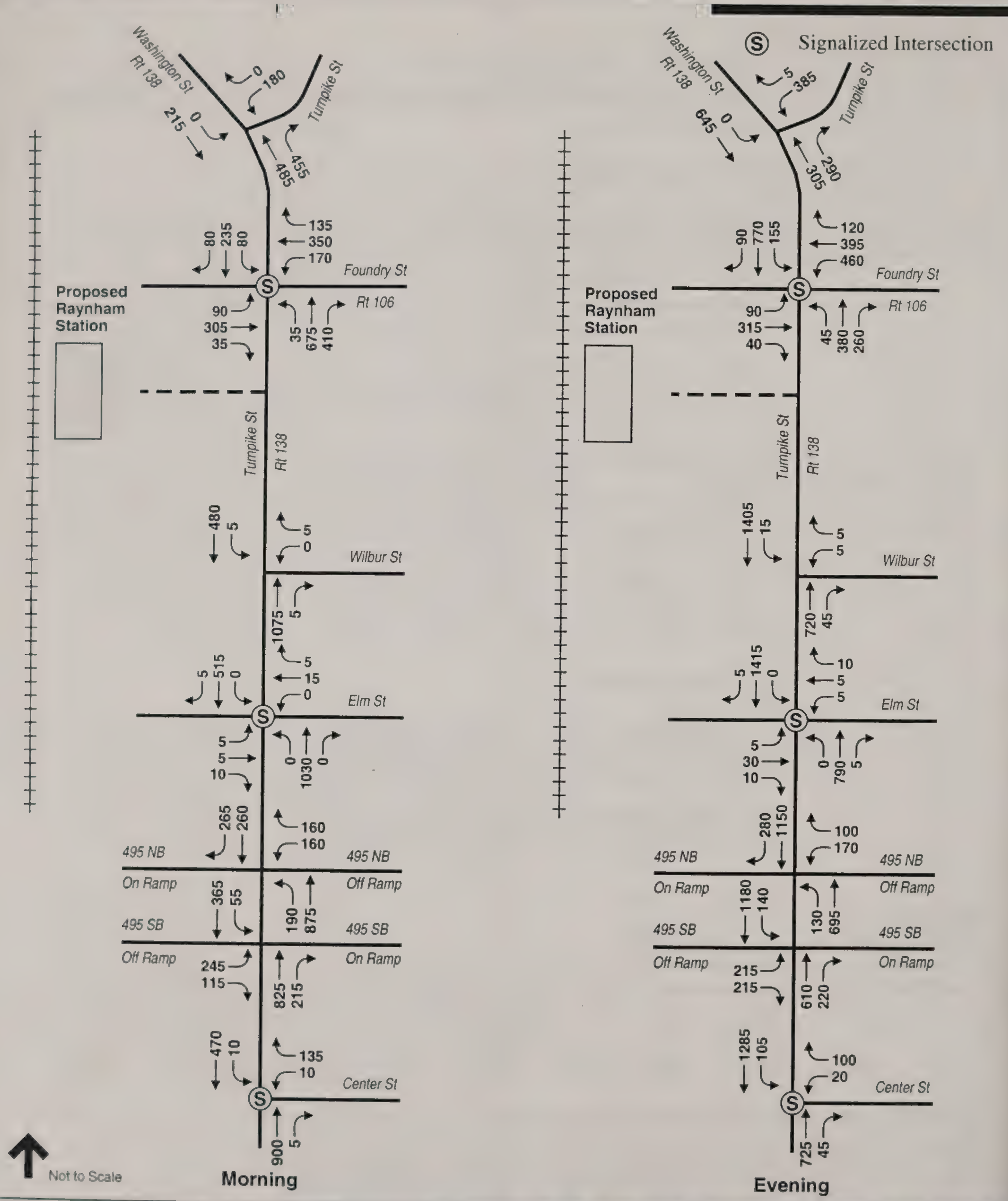
A growth factor was applied to 1998 Existing Condition traffic volumes in the Raynham station study to estimate 2010 No–Build Condition traffic volumes. To predict a reasonable growth factor for traffic in the Raynham area, population projections were requested from the Southeastern Regional Planning and Economic Development District (SRPEDD). Population data was requested for Raynham and Easton, since the station is expected to attract residents of both towns. These data indicate that, cumulatively, the population of the two towns is expected to grow from 32,235 in 1996 to approximately 37,176 in 2010. This represents an annual growth of approximately one percent per year. The Town of Raynham was contacted to identify potential developments that would be likely to affect traffic conditions near the station. Based on subsequent discussions, there appear to be no planned developments or roadway improvements that would further impact traffic operations near this proposed station. Subsequently, an annual growth rate of 1 percent was applied to the 1998 Existing Condition traffic volumes to produce 2010 No–Build Condition traffic volumes. The 2010 No–Build Condition morning and evening peak hour traffic volumes are presented in Figure 4.5-5.

2010 Build Condition

2010 Build Condition traffic volumes were developed by adding anticipated station–generated traffic volumes to the 2010 No–Build traffic volumes. Arrival and departure patterns at the Raynham station were assumed to be the same as those used in the development of trip generation volumes for the North Easton Station. The trip generation for the Raynham Station is presented in Table 4.5–13.

Table 4.5–13
Trip Generation: Raynham Station

	Daily			Morning Peak Hour			Evening Peak Hour		
	Park	Pick-up/ Drop-off	Total	Park	Pick-up/ Drop-off	Total	Park	Pick-up/ Drop-off	Total
In	250	50	300	150	25	175	25	25	50
Out	250	50	300	0	25	25	150	25	175
Total	500	100	600	150	50	200	175	50	225



Raynham Station
2010 No Build Peak Hour
Traffic Volumes

Figure 4.5-5

These peak hour traffic volumes were then distributed and assigned to the study area roadway network based on the location of the proposed station in relation to the existing population and nearby employment/activity centers. Table 4.5–14 summarizes the directional trip distribution that was applied to assign station–generated peak hour traffic volumes to the study area roadway network.

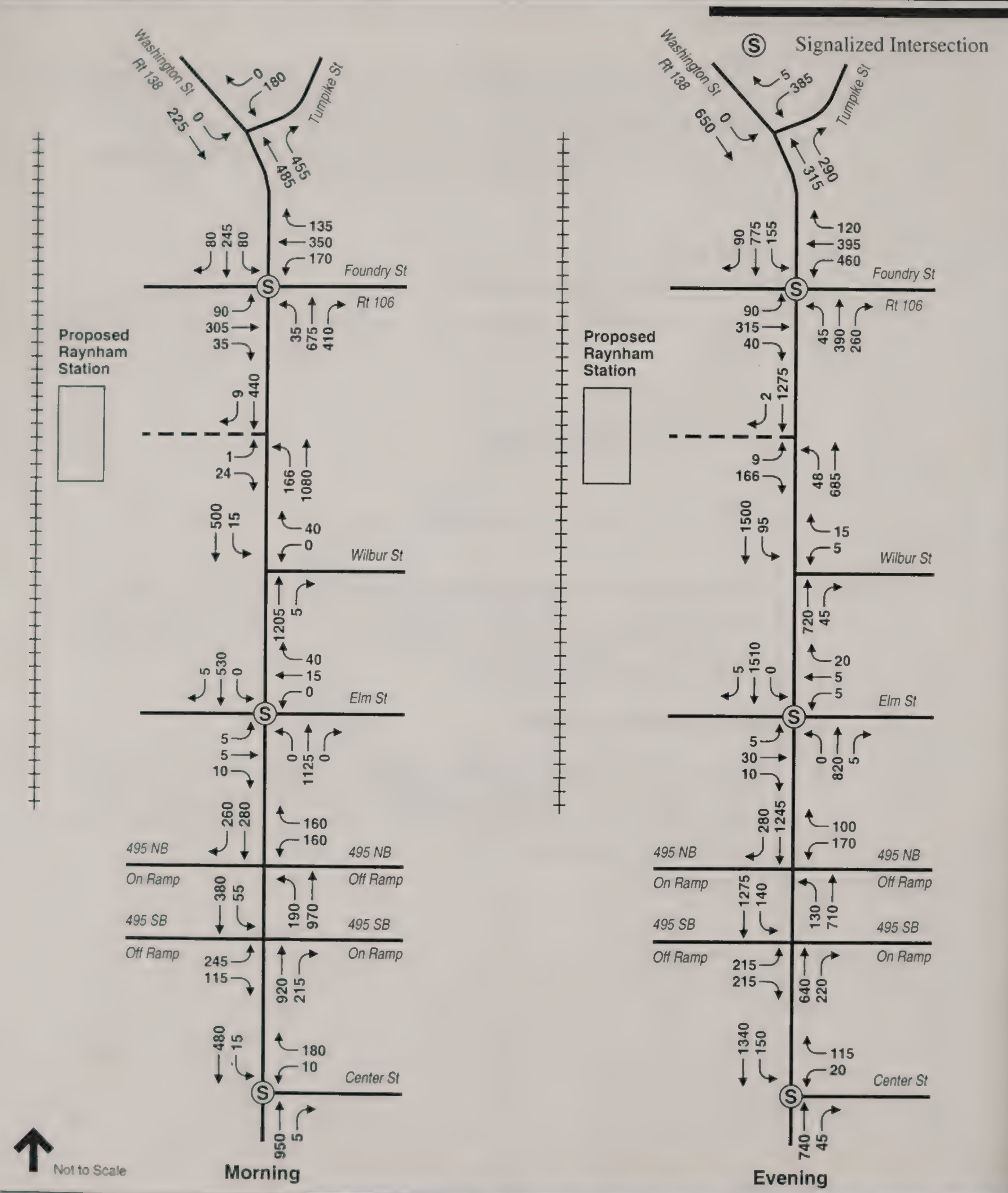
Table 4.5–14
Trip Distribution: Raynham Station

Origin	Percent Distribution
From North (Route 138)	5%
From South (Route 138)	30%
From East (Center Street/Elm Street/I–495))	65%
Total	100%

Note from Table 4.5–14 that approximately 95 percent of all station–generated traffic originates from points south and east along Route 138. These percentages were used to develop 2010 Build Condition morning and evening peak hour traffic volumes, which are presented in Figure 4.5-6.

Traffic Operations Analysis

Roadway capacity analyses were then conducted to evaluate No–Build and Build traffic conditions. The resulting signalized and unsignalized intersection level–of–service analyses for both the 2010 No–Build Condition and 2010 Build Condition are summarized in Table 4.5–15.



New Bedford / Fall River Commuter Rail

Raynham Station
2010 Build Peak Hour
Traffic Volumes

Figure 4.5-6

Table 4.5–15
Level–of–Service Summary: Raynham Station Study Area
2010 No–Build and Build Conditions

		2010 No–Build Condition			2010 Build Condition		
Signalized Intersection	Peak Hour	V/C*	Delay	LOS***	V/C	Delay	LOS
Route 138 (Turnpike Street) @ Route 106 (Foundry Street)	AM Peak	0.82	16	C	0.83	16	C
	PM Peak	*	*	F	*	*	F
Route 138 (Broadway) @ Elm Street	AM Peak	0.37	3	A	0.42	3	A
	PM Peak	0.52	3	A	0.52	4	A
Unsignalized Intersections	Peak Hour	Critical Movement	Delay	LOS	Critical Movement	Delay	LOS
Route 138 / Turnpike Street	AM Peak	WB Left	29	F	WB Left	30	F
	PM Peak	WB Left	304	F	WB Left	319	F
Route 138 / Wilbur Street	AM Peak	WB Movements	9	B	WB Movements	12	C
	PM Peak	WB Movements	40	E	WB Movements	115	F
Route 138 / I–495 NB Ramps	AM Peak	WB Left	374	F	WB Left	512	F
	PM Peak	WB Left	>999	F	WB Left	>999	F
Route 138 / I–495 SB Ramps	AM Peak	EB Left	576	F	EB Left	769	F
	PM Peak	EB Left	>999	F	EB Left	>999	F
Route 138 / Center Street	AM Peak	WB Movements	8	B	WB Movements	9	B
	PM Peak	WB Movements	75	F	WB Movements	167	F
Route 138 @ Site Driveway	AM Peak	—	—	—	EB Left	75	F
	PM Peak	—	—	—	EB Left	63	F

* Volume to capacity ratio.
** Average intersection delay expressed in seconds per vehicle.
*** Level–of–service.
NA Not applicable. Delay cannot be accurately calculated when V/C exceeds

As shown in Table 4.5–15, several of the signalized and unsignalized intersections are projected to operate at unacceptable levels–of–service during peak hours under both 2010 No–Build and Build Conditions. The intersection of Route 138 and Route 106 requires additional capacity for left–turn movements to improve operations during the evening peak hour. Similar to the North Easton study area, many of the unsignalized intersections operate poorly only during peak periods due to a small number of left–turning movements from the respective minor street onto Route 138. These vehicles experience delay due to the high through traffic volumes on Route 138 that result in insufficient gaps in the traffic stream. Note that the total new traffic expected to be generated by the proposed Raynham station is relatively small and will have only a minimal effect on delay at area intersections. There are several large curb cuts serving the dog track. A more refined set of driveway openings will be created to serve the T station and park.

The site driveway eastbound left turn movement is expected to operate at LOS F however, the number of vehicles projected to make this movement is very low (between 1 and 10 vehicles) with the remainder making a right turn out of the driveway. During the evening peak hour this right turn is expected to operate at LOS D.

Mitigation

Mitigation measures were examined to determine if signalization improvements would be adequate to improve the peak period LOS at the intersection of Route 138 and Route 106. This intersection is expected to operate at LOS F under future No-Build conditions during the evening peak hour. Optimised signal phasing at this intersection, which currently experiences LOS F and is projected to experience LOS F under both the No–Build and Build Conditions, will not adequately improve the LOS. Added left turn capacity during the evening peak hour would be required to improve the operating condition at this intersection.

No mitigation is proposed for the five unsignalized intersections in Raynham that will operate at LOS F during the evening or morning and evening hours. These delays appear during peak traffic periods and affect only a small number of turning vehicles.

The signalized intersection of Route 138, Foundry Street at Route 106, Turnpike Street is projected to operate at an unacceptable level–of–service during the both the 2010 No-Build and Build evening peak hour condition. In order to improve level–of–service at this intersection, exclusive left–turn lanes will be necessary along each of the four approaches. In order to accommodate the improvements, roadway widening will be required along all four approaches. In addition to the widening, an upgrade of the current signal equipment will be necessary to accommodate new signal phasing. With these improvements, the level–of–service at this intersection will improve from a LOS C to a LOS B during the 2010 Build morning peak hour and from an LOS F to an LOS D during the 2010 evening peak hour.

4.5.1.4 Dean Street

The proposed Dean Street Station would serve City of Taunton residents. The proposed station site is located off of Railroad Avenue near the intersection of Route 44 (Dean Street) and Arlington Street in Taunton. Adjacent land uses near the site are primarily industrial, but the area is also surrounded by a substantial residential neighborhood. Access to the site would be provided primarily via Route 44. The site can also be accessed via a number of local streets. The proposed Dean Street Station has been designed to accommodate pick–up/drop–off activity and parking for 500 vehicles.

1998 Existing Condition

Inventory of Roadways and Intersections

This section provides a description of major roadways and key intersections within the vicinity of the proposed Dean Street Commuter Rail Station site.

Roadways

- ***Route 138 (Broadway).*** Route 138 (Broadway) is a two–lane roadway that extends in a north–south direction from Stoughton to Taunton. The roadway generally provides one travel lane in each direction with narrow shoulders on each side of the roadway through developed sections of Taunton. Land uses include a mix of commercial, retail, and residential types. Route 138 would provide access to the site (via Arlington Street) for residents of the northern sections of Taunton.

- ***Route 44 (Dean Street).*** Route 44 (Dean Street) is a state–owned two–lane roadway that extends in an east–west direction from Plymouth to Seekonk. In the vicinity of the site, the roadway generally provides one travel lane in each direction with four foot wide shoulders on each side of the roadway. Land uses along Route 44 include commercial and residential types. Route 44 would serve as the primary access route for commuters originating from the eastern and western sections of Taunton.

- ***Washington Street.*** Washington Street is a town owned two–lane roadway that extends in an north–south direction from west Raynham to Taunton Center. The roadway has one 12 foot travel lane in each direction and will serve as a secondary collector roadway for those travelers accessing the site via Arlington Street. Travelers from the northwestern section of Taunton would utilize Washington Street to access the station site.

- ***Arlington Street.*** Arlington Street is a town owned two–lane roadway that extends in a north–south direction from Route 44 (Dean Street), passes by the proposed commuter rail station site and Route 138, and terminates near Taunton

Center. The roadway has one 12 foot travel lane in each direction and will serve as a secondary accessway to the station. Land uses along Arlington Street are primarily residential, although there are also some scattered commercial uses along the roadway. Arlington Street is re–named Purchase Street north of School Street.

Intersections

- ***Arlington Street/Purchase Street at School Street.*** Arlington Street/Purchase Street at School Street is a four–way unsignalized intersection with STOP–sign control on both School Street approaches. The intersection also has an overhead flashing beacon. All four approaches have one general purpose lane to accommodate all potential turning movements. Both streets are local collector roads and have primarily residential uses along them. Prevailing speeds in the area are approximately 25 to 30 miles per hour (mph).

- ***Washington Street at Route 138 (Broadway).*** Washington Street at Route 138 (Broadway) is a four–way signalized intersection. The two Route 138 approaches provide two lanes that serve as left–through and through–right lanes. The Washington Street approaches also have two lanes that serve as left–through and through–right lanes. Adjacent land uses include various retail and commercial uses.

- ***Washington Street at Purchase Street.*** Washington Street at Purchase Street is a four–way signalized intersection. The two Route 138 approaches provide two lanes that serve as left–through and through–right lanes. The Arlington Street approaches each have one general purpose lane. Adjacent land uses primarily include residential uses.

- ***Route 44 (Cape Highway) at Dean Street (Route 104).*** Route 44 (Cape Highway) at Dean Street is a four–way signalized intersection. The Route 44 eastbound approach provides two lanes that serve as left–through and through–right lanes. The Route 44 westbound approach has three lanes, including an exclusive left–turn lane (into Globe Liquors), a through lane, and a "free" right–turn lane onto Dean Street. Dean Street provides two lanes that serve as left–through and through–right lanes. The fourth leg of the intersection is the primary site drive to Globe Liquors and a produce stand and has two lanes, a left–through lane and a through–right lane. Land uses adjacent to the intersection are primarily commercial in nature.

- ***Route 44 (Dean Street) at Longmeadow Road.*** Route 44 (Dean Street) at Longmeadow Road is four–way signalized intersection. The two Route 44 approaches provide three lanes, including an exclusive left–turn lane, a through lane, and a shared through/right–turn lane. The Longmeadow Road approaches each have two lanes that serve as left–through and through–right lanes.

Prevailing vehicle speeds in the area are approximately 40 to 45 mph. Adjacent land uses in the area are primarily residential.

- *Route 44 (Dean Street) at Arlington Street.* Route 44 (Dean Street) at Arlington Street intersect to form a three–way T–intersection. This intersection is signalized with two lanes on each approach. Vehicle speeds along Route 44 near the intersection were observed to be approximately 40 to 45 mph. Adjacent land uses include mostly small commercial and residential uses. This intersection is close to the proposed station site.

- *Route 44 (Church Green) at Route 138 (Broadway).* Route 44 (Main Street) at Route 138 (Broadway) is a four–way intersection that forms the southeast corner of the Taunton Green rotary. The northbound approach to the intersection provides a through lane and a right–turn lane. The eastbound approach provides an exclusive left–turn lane, two through lanes, and a right–turn lane. The westbound approach has two right–turn lanes. There are no southbound or westbound through movements at this location. Prevailing speeds in the area are approximately 10 to 20 mph and land uses in the area are mostly commercial in nature.

- *Route 44 (Church Green) at Sumner Street.* Route 44 (Main Street) at Sumner Street intersect to form a three–way T–intersection near Taunton Center. This intersection is signalized with one shared, multi–purpose lane for each approach. Vehicle speeds along Route 44 near the intersection were observed to be approximately 30 miles per hour. Adjacent land uses include mostly commercial uses.

Existing Traffic Volumes

Traffic volume data for the Dean Street Station Study Area were collected in May 1998 and included Automatic Traffic Recorder Counts (ATRs) and Manual Turning Movement Counts (TMCs). ATR data were collected at the following locations:

- Arlington Street north of Dean Street
- Route 44 (Dean Street) west of Arlington Street

Table 4.5–16 presents a summary of the recorded ATR volumes on a daily basis and during peak periods.

Table 4.5–16
Existing Traffic Volume Summary
Dean Street Station Study Area

			Evening Peak Hour			Saturday Midday Peak Hour		
Location	Direction	ADT*	Volume	K Factor	Directional Distribution	Volume	K Factor	Directional Distribution
Arlington Street north of	Eastbound	1,900	170	8.9	42%	160	8.4	36%
Dean Street	Westbound	3,000	240	8.0	58	290	9.7	64
	Total	4,900	410	8.4	100	450	9.2	100
Route 44 (Dean Street) west of	Eastbound	11,500	800	7.0	52	820	7.1	45
Arlington Street	Westbound	13,300	730	5.5	48	1,020	7.7	55
	Total	24,800	1,530	6.2	100	1,840	7.4	100

Source: Vanasse Hangen Brustlin, Inc. Based on automatic traffic recorder counts conducted March 1998.

* ADT – Average Daily Traffic volume expressed in vehicles per day.

** K–Factor represents the percent of daily traffic which occurs during the peak hour.

*** Directional distribution of peak hour traffic.

As presented in Table 4.5–16, Arlington Street carries approximately 4,900 vehicles per day (vpd) on a typical weekday with approximately 410 vehicles per hour (vph) occurring during the weekday morning peak hour and approximately 450 vph occurring during the weekday evening peak hour. Route 44 carries approximately 24,800 vpd on a typical weekday, with approximately 1,530 vph occurring during the weekday morning peak hour and approximately 1,840 vph occurring during the weekday evening peak hour.

TMCs were collected during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods at each of the ten study area intersections. These observed volumes were reviewed, balanced, and rounded to the nearest five to develop the traffic volume networks used to evaluate existing traffic operations. Peak hour traffic flow networks for an existing weekday morning and evening peak hour are shown in Figures 4.5-7 and 4.5-8, respectively. A summary of raw ATR and TMC data is included in the Supplemental Information.

Accident Analysis Summary

In order to identify accident trends in the study area, accident data for the study area intersections were obtained from the MassHighway for the most recent three–year period available (1995–1997). A summary of the accident data is provided in Table 4.5–17.

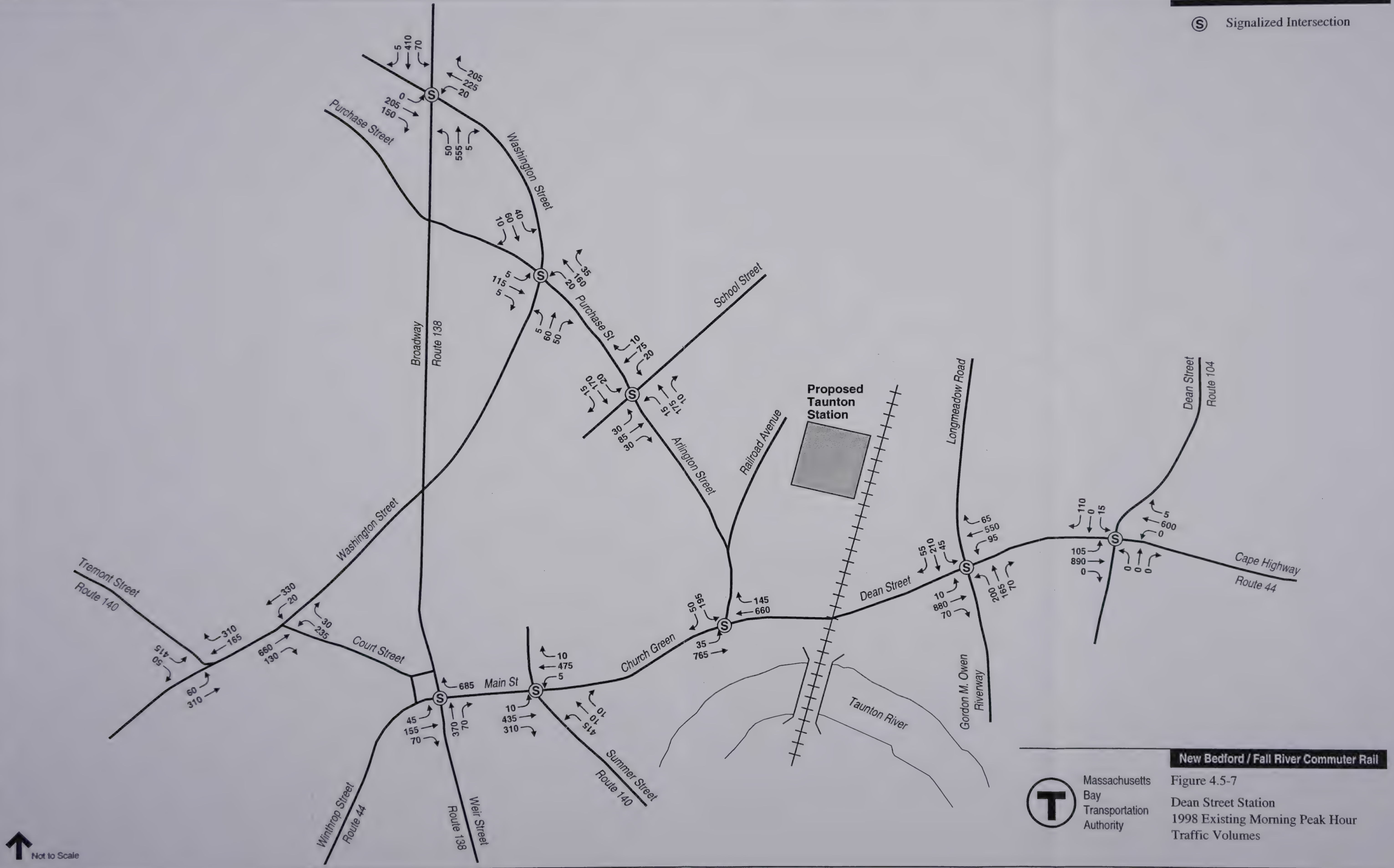


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Figure 4.5-7

Dean Street Station
1998 Existing Morning Peak Hour
Traffic Volumes

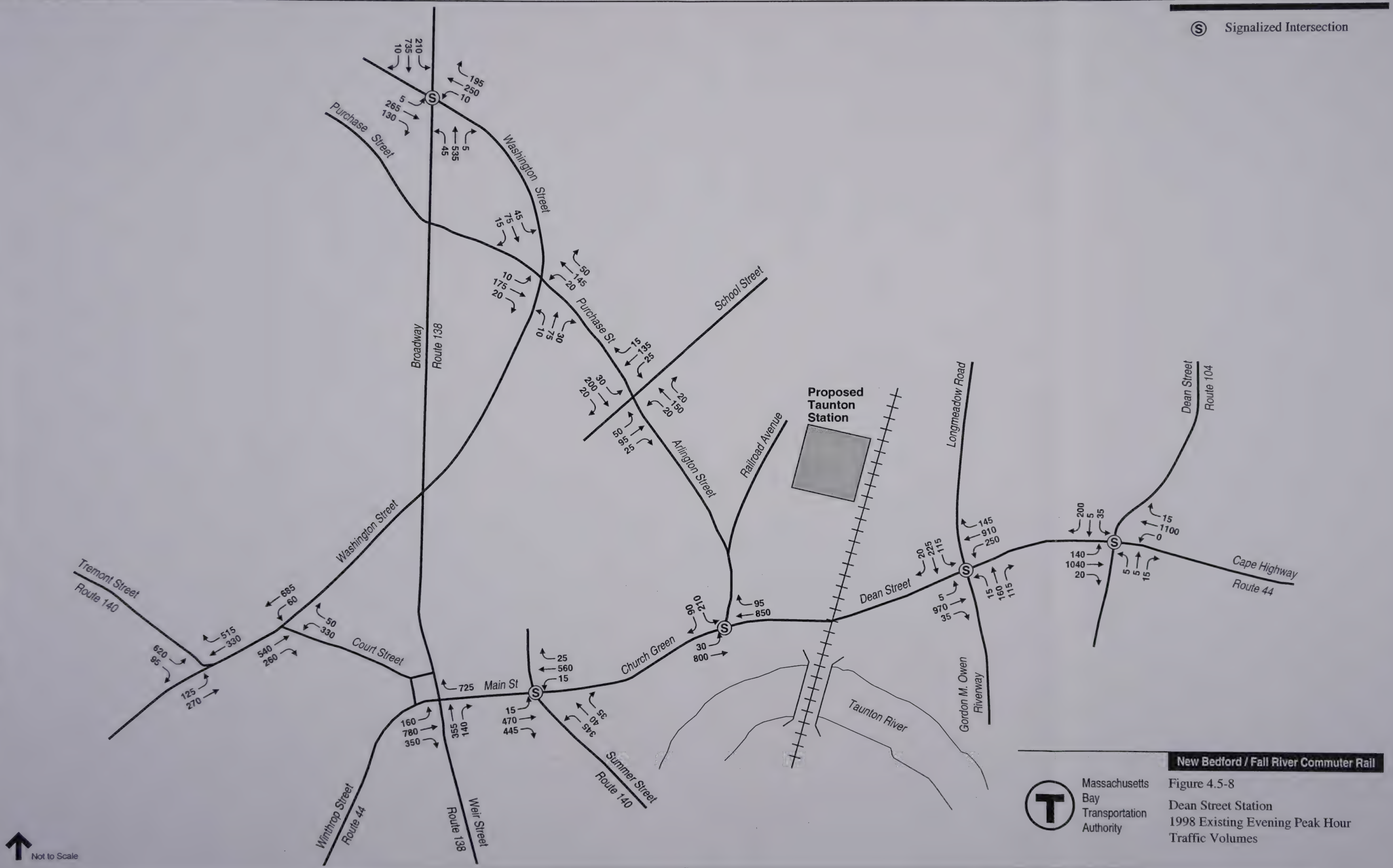

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Figure 4.5-8

Dean Street Station
1998 Existing Evening Peak Hour
Traffic Volumes

Table 4.5–17
Intersection Accident Summary — 1995 to 1997
Dean Street Station Study Area

		Arlington Street at	Washington Street at				Route 44 (Dean Street) at			(Route 44) Church –Green/ Main Street at	
Scenario	Total	School Street	Tremont Street	Broadway	Arlington Street	Court Street	Cape Highway	Longmeadow Road	Arlington Street	Broadway	Summer Street
Year											
1995	97	5	12	14	6	7	2	15	8	23	5
1996	90	7	9	12	4	7	8	16	6	17	4
1997	108	9	8	13	4	9	7	27	2	19	10
Total	295	21	29	39	14	23	17	58	16	59	19
Type											
Angle	152	15	16	26	10	10	5	26	4	32	8
Rear–end	109	2	10	11	0	9	10	27	11	20	9
Head–on	8	0	0	1	0	2	0	4	0	1	0
Unknown–Other	26	4	3	1	4	2	2	1	1	6	2
Total	295	21	29	39	14	23	17	58	16	59	19
Severity											
Property Damage Only	184	13	20	25	6	16	8	31	9	45	11
Personal Injury	94	7	8	11	8	7	7	23	7	10	6
Fatality	1	0	0	0	0	0	1	0	0	0	0
Unknown	16	1	1	3	0	0	1	4	0	4	2
Total	295	21	29	39	14	23	17	58	16	59	19
Weather											
Clear	203	15	20	26	11	16	13	36	11	41	14
Cloudy	52	4	7	7	2	3	1	16	1	9	2
Rain	30	1	2	5	0	2	2	4	3	7	3
Snow	8	1	0	1	1	2	0	2	0	2	0
Fog	1	0	0	0	0	0	0	0	1	0	0
Unknown	1	0	0	0	0	0	1	0	0	0	0
Total	295	21	29	39	14	23	17	58	16	59	19
Time											
7:00 AM to 9:00 AM	48	4	6	7	1	4	2	11	3	7	3
9:00 AM to 4:00 PM	119	10	8	12	4	10	8	26	6	26	9
4:00 PM to 6:00 PM	52	3	6	12	1	1	5	9	5	6	4
6:00 PM to 7:00 AM	76	4	9	8	8	8	2	12	2	20	3
Other	0	0	0	0	0	0	0	0	0	0	0
Total	295	21	29	39	14	23	17	58	16	59	19

Source: Compiled by Vanasse Hangen Brustlin, (VHB) Inc. from Massachusetts Highway Department.

As shown in Table 4.5–17, 295 total accidents occurred within the study area over the three year period from 1995 to 1997, or approximately 93 accidents per year. A brief summary of the accident data is provided below:

- Nearly 40 percent of all accidents in the study area occurred along Route 44 at the intersection of Dean Street and Longmeadow Road and Church Green and Broadway. Most of these accidents were angle and/or rear–end accidents, however, and mostly involved only damaged property (few injuries).
- An additional 21 percent of all accidents in the study area occurred at the intersection of Dean Street and Longmeadow Road.
- Nearly 60 percent of all accidents involved only property damage (no personal injury).
- Of the 295 reported incidents in the study area, there was one fatality. It occurred at the intersection of Dean Street and Cape Highway.

A breakdown of the traffic accident summary is provided in the Appendix.

Traffic Operations Analysis
Summary

An analysis of the existing conditions in the vicinity of the Dean Street Station was performed to assess the ability of an intersection to process traffic. Under existing conditions, two of the Dean Street Station study area intersections are unsignalized and eight are signalized. The results of the analyses for these intersections for 1998 Existing conditions are presented in Table 4.5–18.

Most of the Dean Street Station study area intersections currently operate at an acceptable LOS in both of the peak hours analyzed. All of the intersections analyzed operate at LOS A through LOS C in both peak periods. It should be noted, however, that general traffic activity in the downtown Taunton area moves somewhat slowly due to a number of factors, including parking activity (double parking), driveways, pedestrians, and high truck activity.

Table 4.5–18
Level–of–Service Summary: Dean Street Station Study Area
1998 Existing Conditions

	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
Signalized Intersection	**V/C***	**Delay**	**LOS***	**V/C**	**Delay**	**LOS**
Route 44 (Cape Highway) @ Route 104 (Dean Street)	0.46	6	B	0.74	10	B
Route 44 (Dean Street) @ Longmeadow Road	0.81	12	B	0.86	17	C
Route 44 (Dean Street) @ Arlington Street	0.71	7	B	0.87	13	B
Route 44 (Main Street) @ Route 140 (Sumner Street)	0.68	12	B	0.70	13	B
Route 44 (Main Street) @ Route 138 (Weir Street/Broadway)	0.54	8	B	0.60	7	B
Route 140 (Court Street) @ Washington Street	0.46	8	B	0.57	16	C
Route 140 (Washington Street) @ Tremont Street	0.29	16	C	0.41	19	C
Route 138 (Broadway) @ Washington Street	0.75	10	B	0.46	7	B
Unsignalized Intersections	**Critical Movement**	**Delay**	**LOS**	**Critical Movement**	**Delay**	**LOS**
Arlington Street /School Street	WB Movements	7	B	EB Movements	9	B
Washington Street/ Purchase Street	WB Movements	6	B	WB Movements	7	B

* Volume to capacity ratio.
** Average intersection delay expressed in seconds per vehicle.
*** Level–of–service.
NA Not applicable. Delay cannot be accurately calculated when V/C exceeds 1.2.

2010 No–Build Condition

To predict a reasonable traffic growth factor for Taunton, specific population data were requested from the Southeastern Regional Planning and Economic Development District (SRPEDD). These data indicate that the population of the City of Taunton is expected to increase from 51,484 in 1996 to approximately 54,725 in 2010. This corresponds to an annual growth of approximately 0.44 percent per year. In addition, the city was contacted to identify specific developments and roadway improvements that would be likely to affect traffic conditions near the Dean Street station. Based on these discussions, no developments are currently planned that would impact this station, and subsequently, only a background growth rate of one half of a percent per year was applied to 1998 Existing Condition traffic volumes to estimate 2010 No–Build Condition traffic volumes. 2010 No–Build Condition Morning and Evening Peak Hour traffic volumes presented in Figures 4.5-9 and 10.

2010 Build Condition

2010 Build Condition traffic volumes were developed by adding anticipated station–generated traffic volumes to the 2010 No–Build traffic volumes. Arrival and departure patterns assumed at the Dean Street station were assumed to be the same as those used in the development of trip generation volumes for both the North Easton and Raynham stations. The trip generation for the Dean Street Station is presented in Table 4.5–19.

Table 4.5–19
Trip Generation: Dean Street Station

	Daily			Morning Peak Hour			Evening Peak Hour		
	Park	Pick-up/ Drop-off	Total	Park	Pick-up/ Drop-off	Total	Park	Pick-up/ Drop-off	Total
In	327	60	387	196	30	226	33	30	63
Out	327	60	387	0	30	30	196	30	226
Total	654	120	774	196	60	256	229	60	289

A summary of the directional distribution for the Dean Street station is presented in Table 4.5–20.

Table 4.5–20
Trip Distribution: Dean Street Station

Origin	Percent Distribution
From North (Broadway/Washington Street)	35%
From South (Route 138/Route 44/Route 140)	30%
From East (Route 44/Route 104)	10%
From West (Route 140)	25%
Total	100%

Note from Table 4.5–20 that station–generated traffic is expected to originate fairly evenly from many different directions due to the centralized location of this proposed station. These percentages were used to develop 2010 Build Condition morning and evening peak hour traffic volumes, which are presented in Figures 4.5-11 and 4.5-12, respectively.

Traffic Operations Analysis

The resulting signalized and unsignalized intersection level–of–service (LOS) for both the 2010 No–Build and 2010 Build condition for the Dean Street station is summarized in Table 4.5–21.

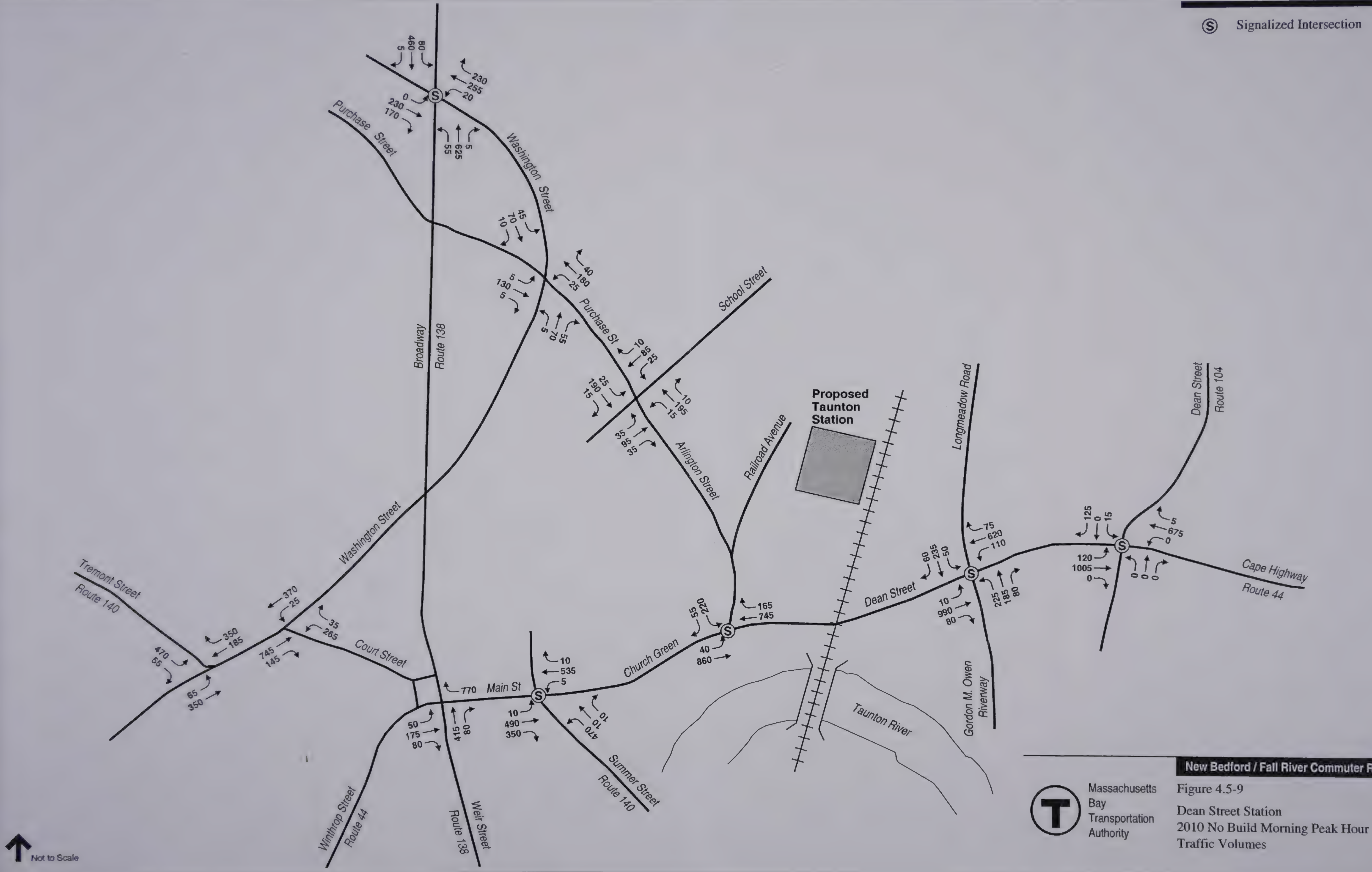

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Figure 4.5-9

Dean Street Station
2010 No Build Morning Peak Hour
Traffic Volumes

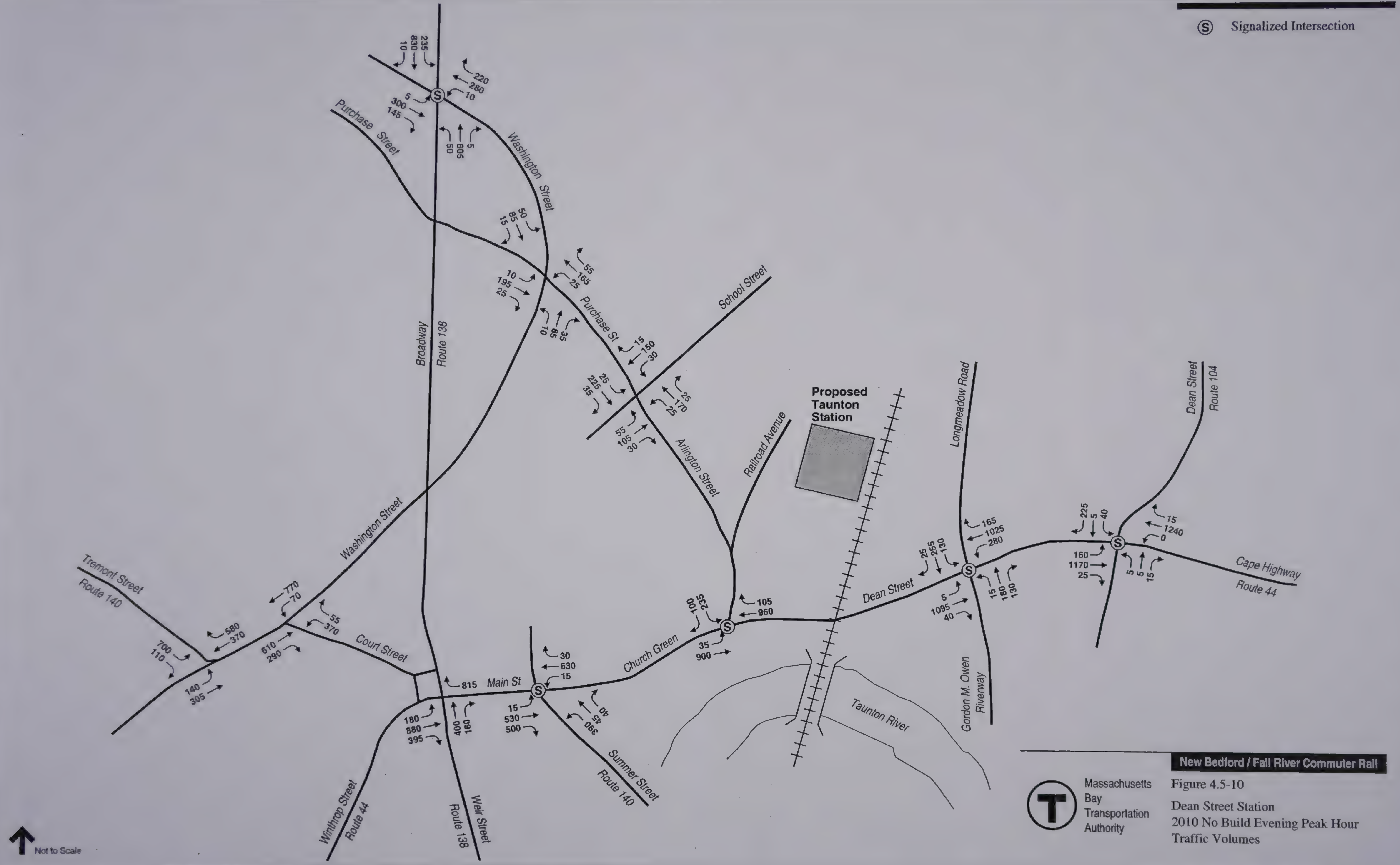

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Figure 4.5-10

Dean Street Station
2010 No Build Evening Peak Hour
Traffic Volumes

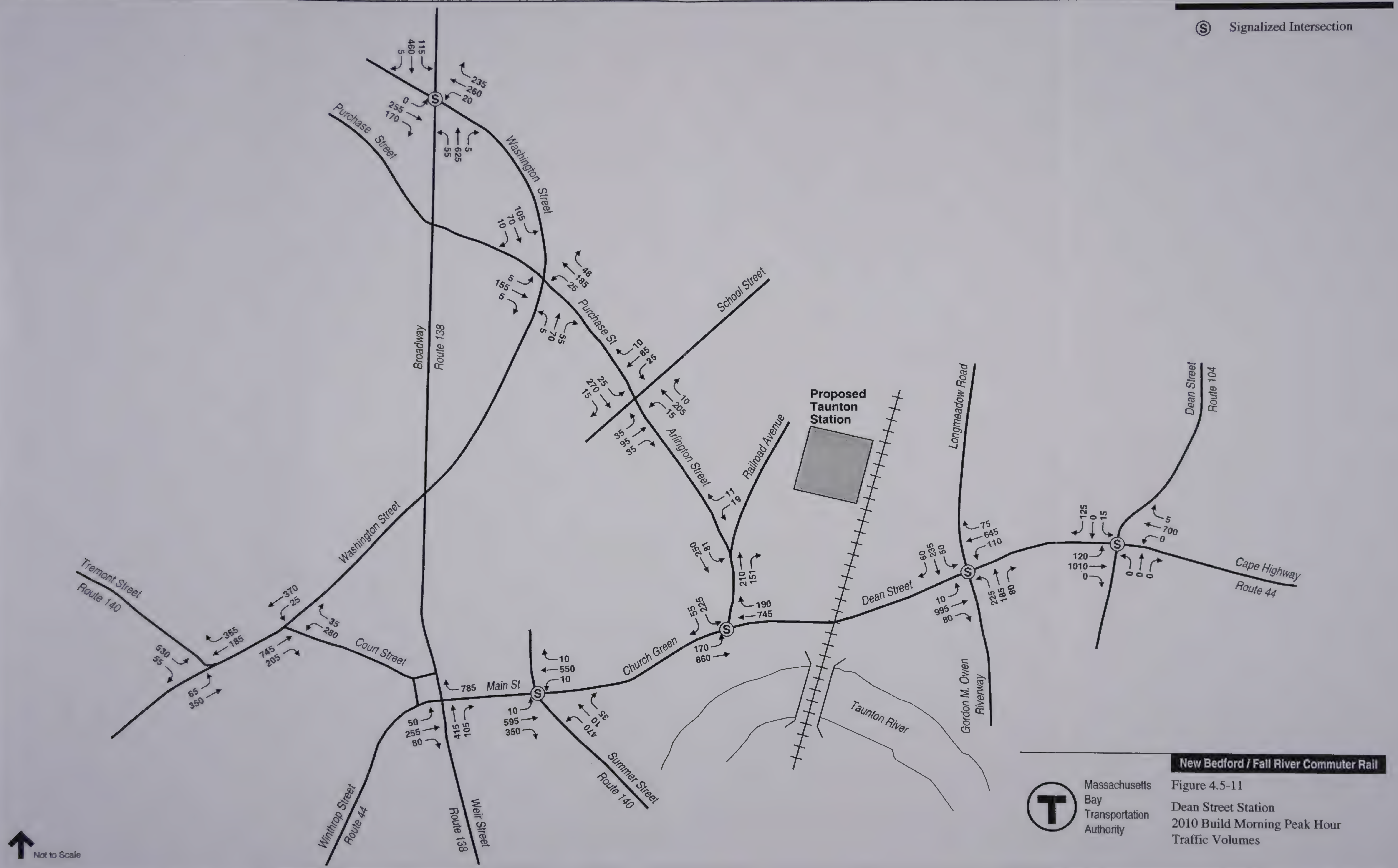

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Figure 4.5-11

Dean Street Station
2010 Build Morning Peak Hour
Traffic Volumes

Ⓢ Signalized Intersection

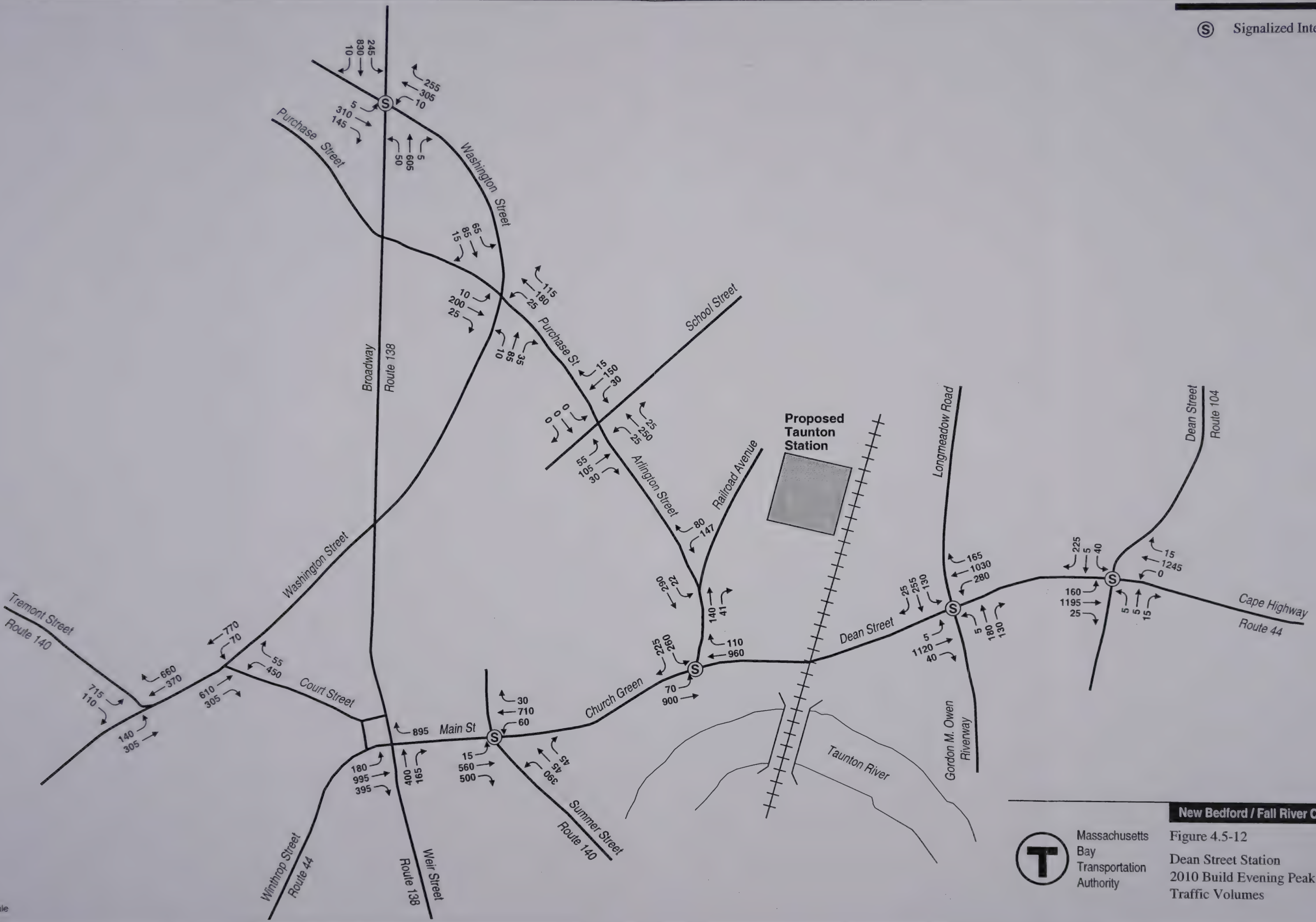

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Figure 4.5-12

Dean Street Station
2010 Build Evening Peak Hour
Traffic Volumes

Table 4.5–21
Level – of – Service Summary
Dean Street Station Study Area
2010 No–Build and Build Conditions

		2010 No–Build Condition			2010 Build Condition		
Signalized Intersection	**Peak Hour**	**V/C***	**Delay**	**LOS*****	**V/C**	**Delay**	**LOS**
Route 44 (Cape Highway) @	AM Peak	0.53	7	B	0.54	7	B
Route 104 (Dean Street)	PM Peak	0.84	17	C	0.85	19	C
Route 44 (Dean Street) @	AM Peak	1.02	26	D	1.02	26	D
Longmeadow Road	PM Peak	1.00	24	C	0.96	32	D
Route 44 (Dean Street) @	AM Peak	0.79	10	B	1.00	14	B
Arlington Street	PM Peak	0.88	13	B	1.01	30	D
Route 44 (Main Street) @	AM Peak	0.77	16	C	0.82	20	C
Route 140 (Sumner Street)	PM Peak	0.79	13	B	0.88	17	C
Route 44 (Main Street) @	AM Peak	0.61	9	B	0.61	9	B
Route 138 (Weir Street/Broadway)	PM Peak	0.68	9	B	0.74	15	C
Route 140 (Court Street) @	AM Peak	0.51	7	B	0.55	7	B
Washington Street	PM Peak	0.68	9	B	0.74	15	C
Route 140 (Washington Street) @	AM Peak	0.33	16	C	0.35	17	C
Tremont Street	PM Peak	0.49	21	C	0.52	25	C
Route 138 (Broadway) @	AM Peak	0.49	9	B	0.54	10	B
Washington Street	PM Peak	0.87	13	B	0.91	19	C
Unsignalized Intersections	**Peak Hour**	**Critical Movement**	**Delay**	**LOS**	**Critical Movement**	**Delay**	**LOS**
Arlington Street / School Street	AM Peak	EB Movements	8	B	EB Movements	9	B
	PM Peak	EB Movements	10	C	EB Movements	13	C
Washington Street/	AM Peak	WB Movements	7	B	WB Movements	10	B
Purchase Street	PM Peak	WB Movements	8	B	WB Movements	10	B
Arlington Street /	AM Peak	—	—	—	WB Movements	7	B
Site Driveway	PM Peak	—	—	—	WB Movements	8	B

* Volume to capacity ratio.

** Average intersection delay expressed in seconds per vehicle.

*** Level–of–service.

NA Not applicable. Delay cannot be accurately calculated when V/C exceeds 1.2.

Under the 2010 No–Build conditions all of this study area's signalized and unsignalized intersections will operate at acceptable level–of service during both morning and evening peak hours. These intersections are expected to continue operate at acceptable levels of service during the peak hours with the additional traffic generated by the proposed commuter rail station.

Access to the site would be provided adjacent to Arlington Street. The intersection of Railroad Avenue and Arlington Street will not require signalization to operate within an acceptable level–of–service. It is projected that minor street movements (from Railroad Avenue) will operate at LOS B during both the morning and evening peak hours.

Mitigation

No traffic mitigation is expected to be necessary in Taunton as a result of the proposed Dean Street Station. Vehicles in this area are expected to be well–distributed throughout the traffic network, and all intersections in the study area are expected to operate at LOS D or better.

4.5.2.5 Freetown

The Freetown Station will serve as an intermediate station stop along the proposed New Bedford/Fall River Commuter Rail Extension's Fall River Secondary between East Taunton and Fall River. Access to the site will be provided from Ridge Hill Road in the Town of Freetown. The site is bounded by Route 79 to the northwest, High Street to the northeast and the rail line to the east. Regional access to the site is provided by Route 24 which runs northeast from Newport, Rhode Island and Fall River, Massachusetts to Randolph, Massachusetts where it terminates at I-93 (Route 128). Regional access is also provided by Route 79, which serves the northern section of the City of Fall River and several small towns northeast of the station.

The proposed Freetown Station has been designed to serve the anticipated rail service, with parking provided for 449 vehicles. Separate access will be provided for parking and for the pick–up/drop–off activity. The pick–up/drop–off area is designed to accommodate feeder bus service, although no such service is currently planned.

1998 Existing Condition

Inventory of Roadways

The study area for this analysis focused on the segment of South Main Street (Route 79) between Narrows Road to the south and High Street to the north. The study area includes the Route 24/Route 79 interchange.

A comprehensive field inventory of traffic conditions on the study area roadways was conducted in June 1999. The field inventory consisted of collecting data on existing roadway geometry, traffic volumes, and traffic operations.

Roadways

- *Ridge Hill Road.* Ridge Hill Road is a two–lane roadway that begins at its intersection with South Main Street. Travel lane width along Ridge Hill Road is approximately 32 feet. Sidewalks are not provided along either side of the roadway. Land uses within the vicinity of Ridge Hill Road are a mix of commercial and residential.

- *South Main Street.* South Main Street, which is also signed as Route 79, is a two–lane north–south roadway. In the vicicinty of the site, the roadway is town–owned. Between the Route 24 entrance and exit ramps, the roadway is state–owned. South Main Street provides the primary regional access to the site. The posted speed limit along the roadway is 40 miles–per–hour. The roadway is unmarked and provides a 31–foot bi–directional travel way. Land uses along the roadway are a mix of residential and commercial.

- *Narrows Road.* Narrows Road is a town owned east–west two–lane roadway that extends from the densely populated Pine Island eastward to South Main Street. The roadway is striped to provide two 12–foot travel lanes, one in each direction. Land uses along Narrows Road are primarily residential.

Intersections

- *South Main Street and Ridge Hill Road.* South Main Street and Ridge Hill Road intersect to form a four–way unsignalized intersection. The driveway of the Massachusetts Highway Department Maintenance Facility forms the fourth leg of this intersection. The Ridge Hill Road approach is under STOP–sign control. Pedestrian facilities including sidewalks and crosswalks are not provided at this intersection. Land uses within the vicinity of the intersection are a mix of commercial and residential.

- *South Main Street and High Street.* South Main Street and High Street intersect to form a three–way unsignalized intersection. South Main Street serves as the mainline with one travel lane in each direction. High Street, the minor street approach, consists of one travel lane in each direction approximately 20 feet wide. High Street is under STOP–sign control. There are no pedestrian facilities, sidewalks or crosswalks, at this intersection. Land uses within the vicinity of the intersection are a mix of commercial and residential.

- *South Main Street at Narrows Road.* South Main Street and Narrows Road intersects to form a three–way T–type unsignalized intersection. The northbound and southbound South Main Street approaches each provide a single general–purpose lane. The eastbound Narrows Road approach provides a single general–purpose lane under stop control.

- *South Main Street and Route 24 Southbound Ramps.* South Main Street and the Route 24 southbound ramps intersect to form a three–way T–type unsignalized intersection. The Route 24 southbound ramp approach is comprised of one left–turn lane and one right–turn lane. South Main Street, which is approximately 30 feet wide, is comprised of one travel lane in each direction.

- ***South Main Street and Route 24 Northbound Ramps.*** South Main Street at the Route 24 ramps northbound ramps intersect to form a three–way T–type unsignalized intersection. The Route 24 northbound ramp approach is comprised of one left–turn lane and one right–turn lane. South Main Street, which is approximately 30 feet wide is comprised of one travel lane in each direction

Existing Traffic Volumes

Traffic Volume data for the Freetown Station study area were collected by VHB in June 1999 and included automatic traffic recorder counts (ATRs) and manual turning movement counts (TMCs). For the Freetown Station study area, ATR data were collected at the following locations:

- South Main Street (Route 79), north of Ridge Hill Road
- South Main Street (Route 79, north of Narrows Road
- Ridge Hill Road, south of South Main Street

All of these locations are in the Town of Freetown. Table 4.5–22 presents a summary of the recorded ATR volumes on a daily basis and during peak periods.

Table 4.5–22
Existing Traffic Volume Summary: Freetown Station Study Area

			Morning Peak Hour			Evening Peak Hour		
Location	Direction	ADT[1]	Volume	K[2] Factor	Directional[3] Distribution	Volume	K Factor	Directional Distribution
South Main St., north of Ridge Hill Rd.	Northbound	6,075	300	4.9	39%	517	8.5	56%
	Southbound	5,432	479	8.8	61%	411	7.6	44%
	Total	11,507	779	6.8	100%	928	8.1	100%
South Main St., north of Narrows Rd.	Northbound	2,782	175	6.2	54%	213	7.7	43%
	Southbound	2,912	147	5.0	46%	284	9.8	57%
	Total	5,694	322	5.7	100%	497	8.7	100%
Ridge Hill Road, south of South Main St.	Total	994	114	11.4	N/a	54	5.4	N/a

Source: Vanasse Hangen Brustlin, Inc. Based on automatic traffic recorder counts conducted June 1998.

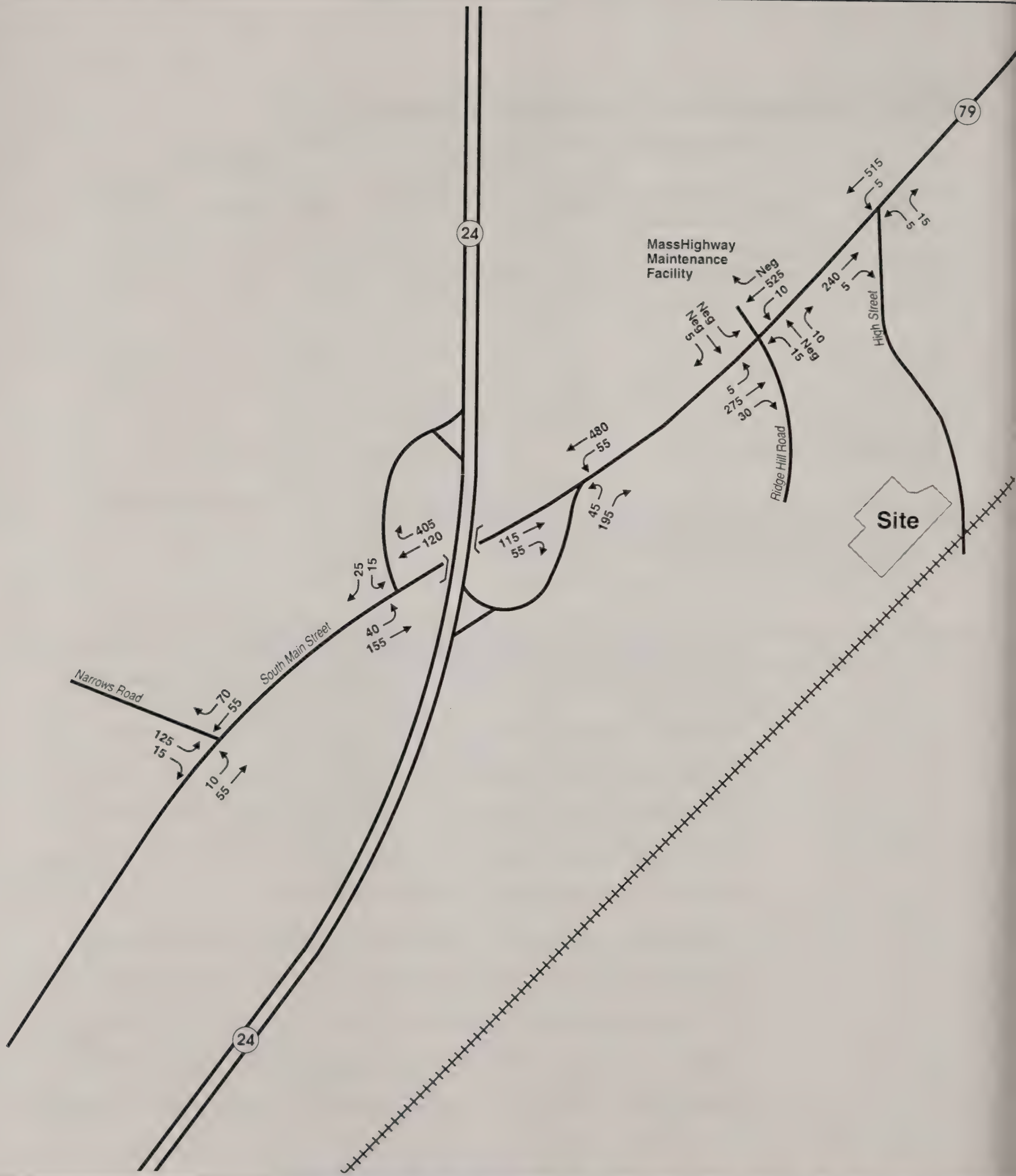
1 ADT – Average Daily Traffic volume expressed in vehicles per day.

2 K–Factor represents the percent of daily traffic which occurs during the peak hour.

3 Directional distribution of peak hour traffic.

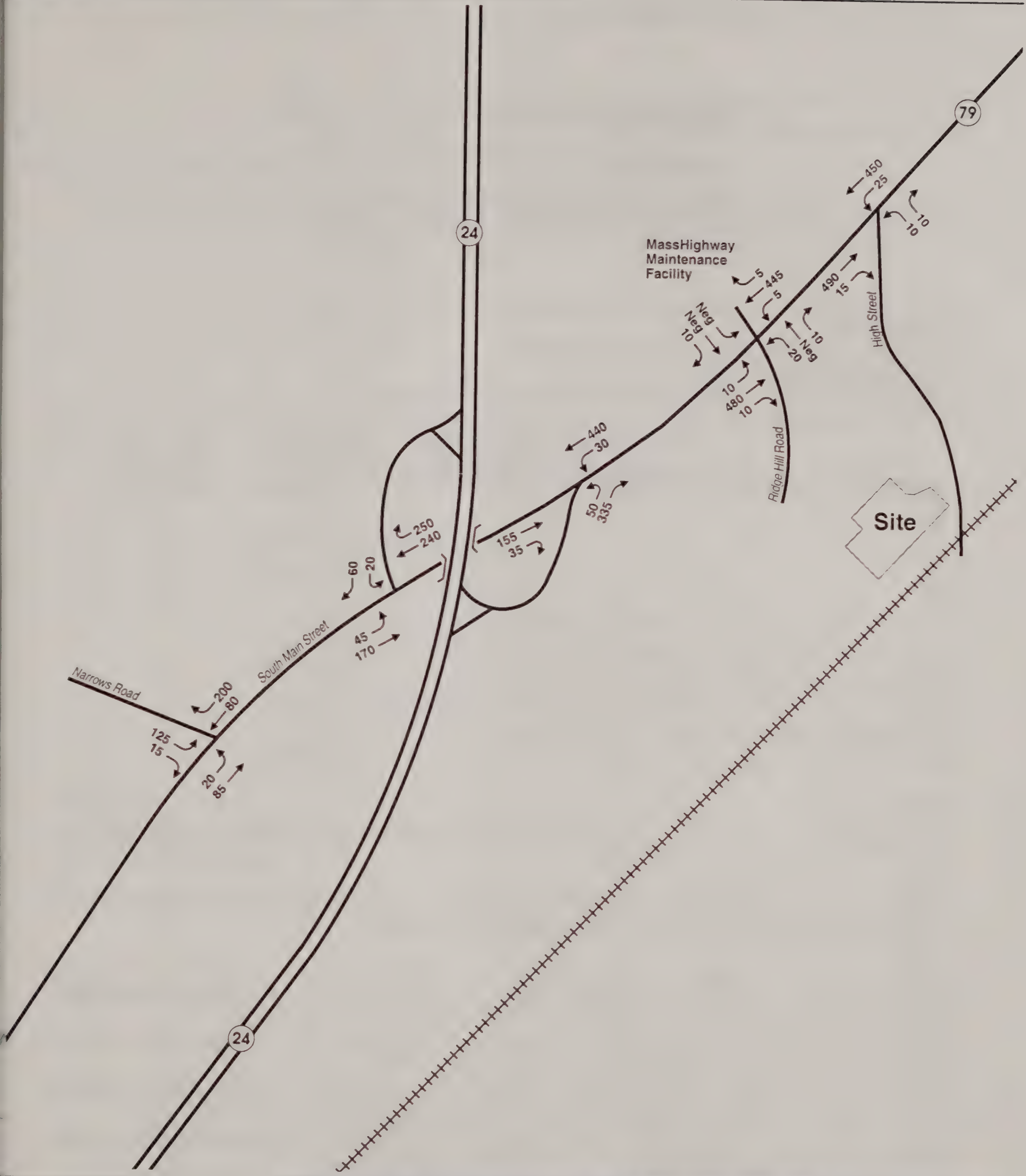
As presented in Table 4.5–22, South Main Street, north of the proposed Freetown station carries approximately 11,500 vehicles per day (vpd) on a typical weekday with approximately 800 vehicles per hour traveling during the weekday morning peak hour and 900 vehicles per hour during the weekday evening peak hour. South of the Route 24 ramps, the daily volume along South Main Street is reduced significantly with a weekday daily volume of 5,700 vpd recorded as well as approximately 325 and 500 vehicles during the respective morning and evening commuter peak hours. Weekday daily volume along Ridge Hill Road, which will serve as the only access to the station parking lot and pick–up/drop–off area, is approximately 1,000 vpd with approximately 115 vehicles and 55 vehicles during the respective morning and evening commuter peak hours.

The TMCs were collected during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods at each of the five study area intersections. These observed volumes were reviewed, and rounded to the nearest five to develop the traffic volume networks used to evaluate existing traffic operations. Peak hour traffic flow networks for 1999 Existing Condition weekday morning and evening peak hours are shown in Figures 4.5-13 and 4.5-14. A summary of raw ATR and TMC data is included in the Supplemental Information.



Freetown Station
1998 Existing Morning Peak Hour
Traffic Volumes

Figure 4.5-13



Freetown Station
1998 Existing Evening Peak Hour
Traffic Volumes

Figure 4.5-14

Accident Analysis Summary

In order to identify accident trends in the study area, accident data for the study area intersections were obtained from MassHighway for the most recent three–year period available (1995–1997). A summary of the accident data is provided in Table 4.5–23.

Table 4.5–23
Intersection Accident Summary — 1995 to 1997
Freetown Station Study Area

Scenario	Total	Route 24 Ramps and South Main St. (Route 79)	Ridge Hill Rd. and South Main St. (Route 79)	Narrows Rd. and South Main St. (Route 79)	High St. and South Main St. (Route 79)
Year					
1995	8	4	3	1	0
1996	7	5	1	1	0
1997	7	4	2	1	0
Total	22	13	6	3	0
Type					
Angle	10	5	4	1	0
Rear–end	6	3	2	1	0
Head–on	1	1	0	0	0
Unknown–Other	5	4	0	1	0
Total	22	13	6	3	0
Severity					
Property Damage Only	9	6	3	0	0
Personal Injury	12	6	3	3	0
Fatality	0	0	0	0	0
Other	1	1	0	0	0
Total	22	13	6	3	0
Weather					
Clear	12	8	4	0	0
Cloudy	4	2	1	1	0
Rain	5	2	1	2	0
Snow	0	0	0	0	0
Fog	1	1	0	0	0
Unknown	0	0	0	0	0
Total	22	13	6	3	0
Time					
7:00 AM to 9:00 AM	6	4	1	1	0
9:00 AM to 4:00 PM	7	3	3	1	0
4:00 PM to 6:00 PM	3	2	0	1	0
6:00 PM to 7:00 AM	6	0	2	0	0
Total	22	13	6	3	0

Source: Compiled by Vanasse Hangen Brustlin, (VHB) Inc. from the Massachusetts Highway Department.

As shown in Table 4.5–23, 22 total accidents occurred within the study area over the three year period from 1995 to 1997, or approximately 7 accidents per year. A brief summary of the accident data is provided below:

- Most of the accidents that occurred in the study area were either angle or rear–end incidents and appear to be fairly evenly distributed at the five intersections along South Main Street.
- There were no traffic accidents reported at the intersection of South Main Street at High Street.
- Approximately 40% percent of the recorded accidents within the study area occurred during the morning peak hour or the evening peak hour.

A breakdown of this traffic accident summary is included in the Supplemental Information.

Traffic Operations Analysis
Summary

An analysis of the existing conditions in the vicinity of the proposed Freetown station was performed to assess the ability of intersections to process traffic associated with a new commuter rail station. Under existing conditions, all five of the study area intersections are unsignalized, including the Route 24 ramps. The results of the analyses for these intersections for 1999 Existing conditions are presented in Table 4.5–24.

Table 4.5–24
Level–of–Service Summary: Freetown Station Study Area 1999 Existing Conditions

	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
Unsignalized Intersections	Critical Movement	Delay[1]	LOS[2]	Critical Movement	Delay	LOS
South Main St. at High Street	Left/Right turns from High St.	5.1	B	Left/Right turns from High St.	9.2	B
South Main St. at Ridge Hill Rd.	Left/Right turns from Ridge Hill Rd.	8.6	B	Left/Right turns from Ridge Hill Rd.	10.9	C
South Main St. at Route 24 NB Ramps	Left turns from Route 24 NB ramp	10.1	B	Left turns from Route 24 NB ramp	9.3	B
South Main St. at Route 24 SB Ramps	Left turns from Route 24 SB ramp	7.4	B	Left turns from Route 24 SB ramp	8.1	B
South Main St. at Narrows Rd.	Left/Right turns from Narrows Rd.	4.9	A	Left/Right turns from Narrows Rd.	6.0	B

[1] Average intersection delay expressed in seconds per vehicle.
[2] Level–of–service.

Under existing conditions, none of the study area intersections experience capacity constraints. The delay presented in the above table is the likely delay along the minor street approach.

2010 No–Build Condition

A growth factor was applied to 1999 Existing Condition traffic volumes in the study area in order to represent 2010 No–Build traffic volumes. To predict a reasonable growth factor that traffic is likely in the Freetown area over the eleven–year forecast period, available population and employment growth projections from the Central Transportation Planning Staff (CTPS) were reviewed. According to CTPS data, the population of Freetown is expected to increase from 8,520 in 1990 to 9,770 in 2010, an increase of 0.7 percent per year for the twenty year period. Employment growth projections provided by CTPS show employment in Freetown increasing from 1,815 in 1990 to 2,698 in 2010, an increase of 2.0 percent per year for the twenty year period.

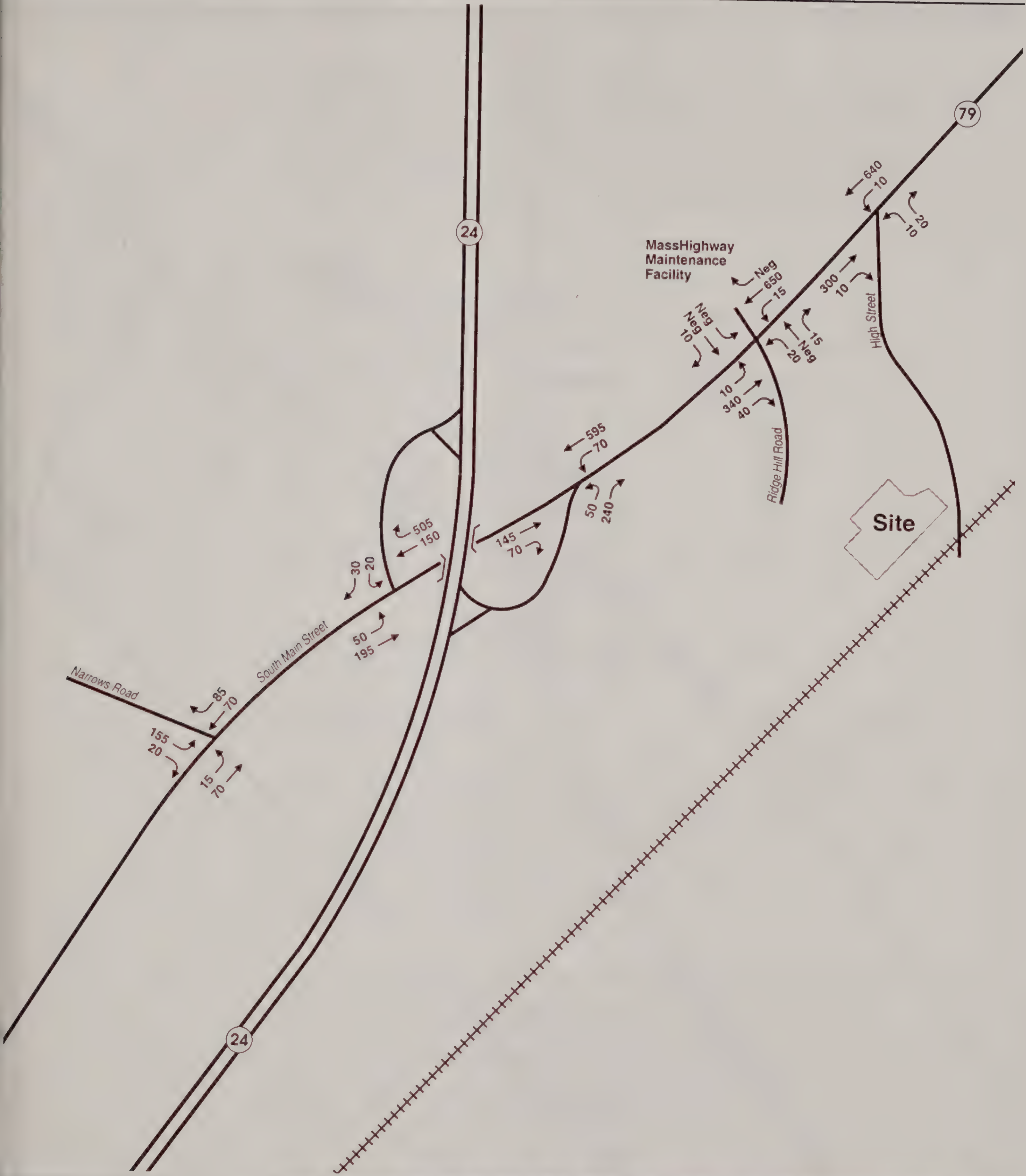
In consideration of the above, the No–Build traffic volumes were developed by applying an overall growth rate of 24 percent (2 percent per year) to the existing traffic volumes. The 2010 No–Build morning and evening peak hour traffic volumes are presented in Figures 4.5-15 and 4.5-16.

2010 Build Condition

2010 Build Condition traffic volumes were developed by adding anticipated station–generated traffic volumes to the 2010 No–Build Condition traffic volumes. Traffic forecasts for the proposed Freetown Station were based on ridership projections that were developed by CTPS. As stated in the Analysis Methodology section, it was estimated that approximately 60 percent of the arrivals occur during the morning peak hour and 60 percent of the departures occur during the evening peak hour. In order to provide a conservative analysis, all of the pickup/drop–off activity was assumed to occur during the peak hours. Trip generation for the Freetown Station is presented in Table 4.5–25.

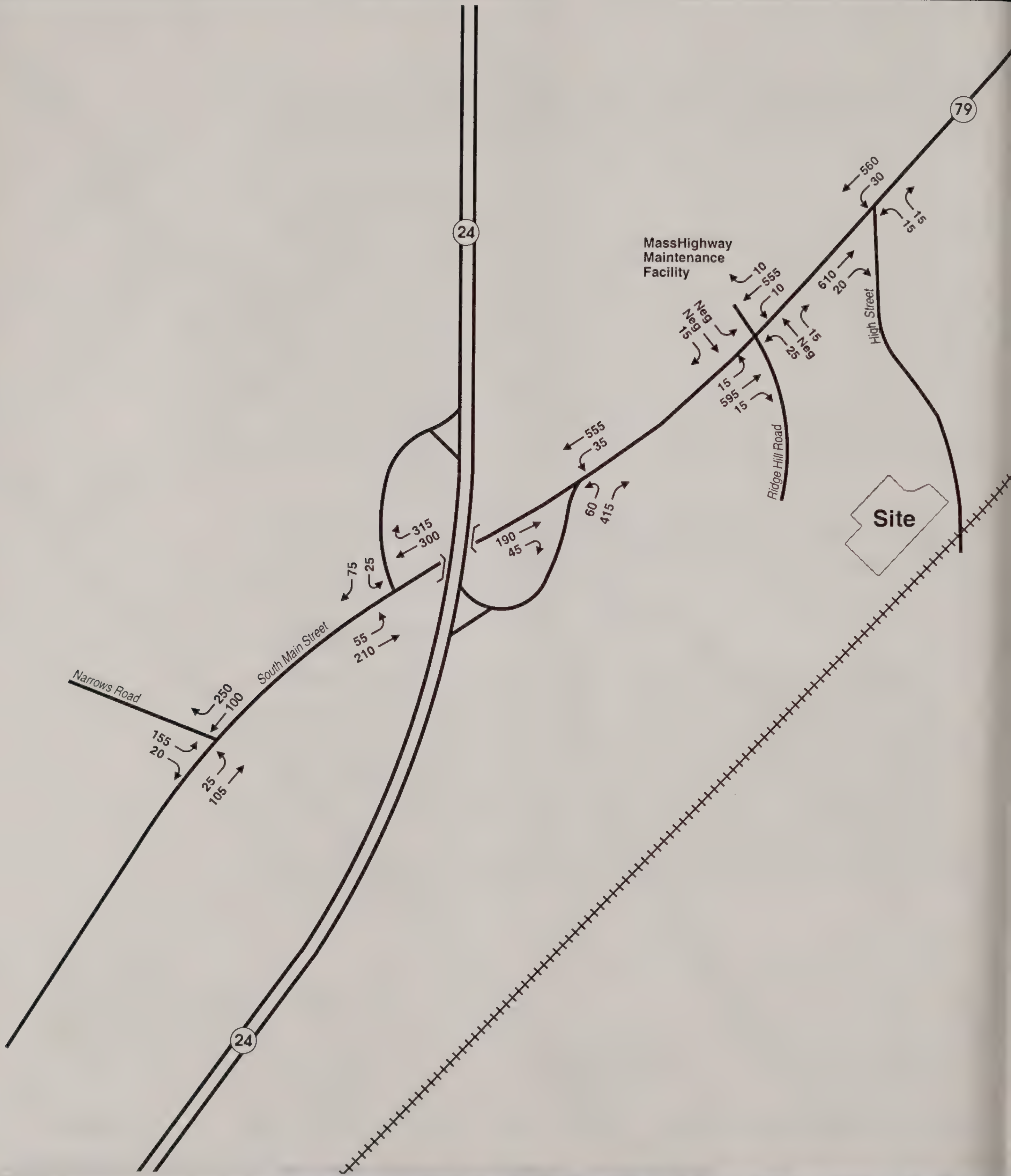
Table 4.5–25
Trip Generation: Freetown Station

	Daily			Morning Peak Hour			Evening Peak Hour		
Movement	Park	Pick–up/ Drop–off	Total	Park	Pick–up/ Drop–off	Total	Park	Pick–up/ Drop–off	Total
In	400	60	460	240	30	270	40	30	70
Out	400	60	460	0	30	30	240	30	270
Total	800	120	920	240	60	300	280	60	340



Freetown Station
2010 No Build Morning Peak Hour
Traffic Volumes

Figure 4.5-15



Freetown Station
2010 No Build Evening Peak Hour
Traffic Volumes

Figure 4.5-16

These peak hour traffic volumes were then distributed and assigned to the study area roadway network based on the location of the proposed station in relation to the existing population and nearby employment/activity centers. Table 4.5–26 summarizes the directional trip distribution that was applied to assign station–generated peak hour traffic volumes to the study area roadway network.

Table 4.5–26
Trip Distribution: Freetown Station

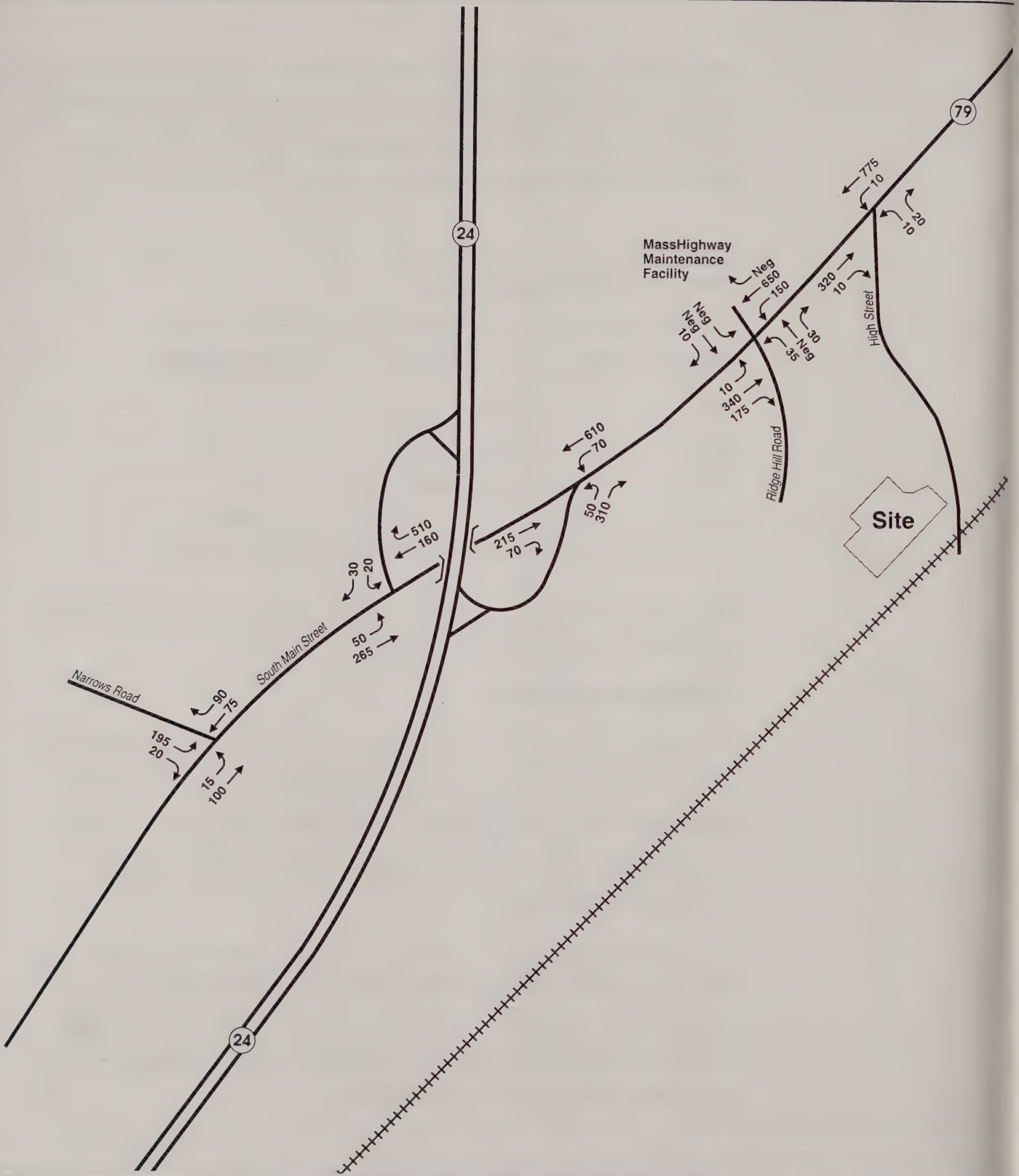
Direction (To/From)	By Way Of	Percent Distribution
South	Route 24	25
South	South Main Street	10
North	South Main Street	50
West	Narrows Road	15
Total		100%

The resulting 2010 Build Condition morning and evening peak hour traffic volumes, are presented in Figure 4.5-17 and 4.5-18.

Traffic Operations Analysis

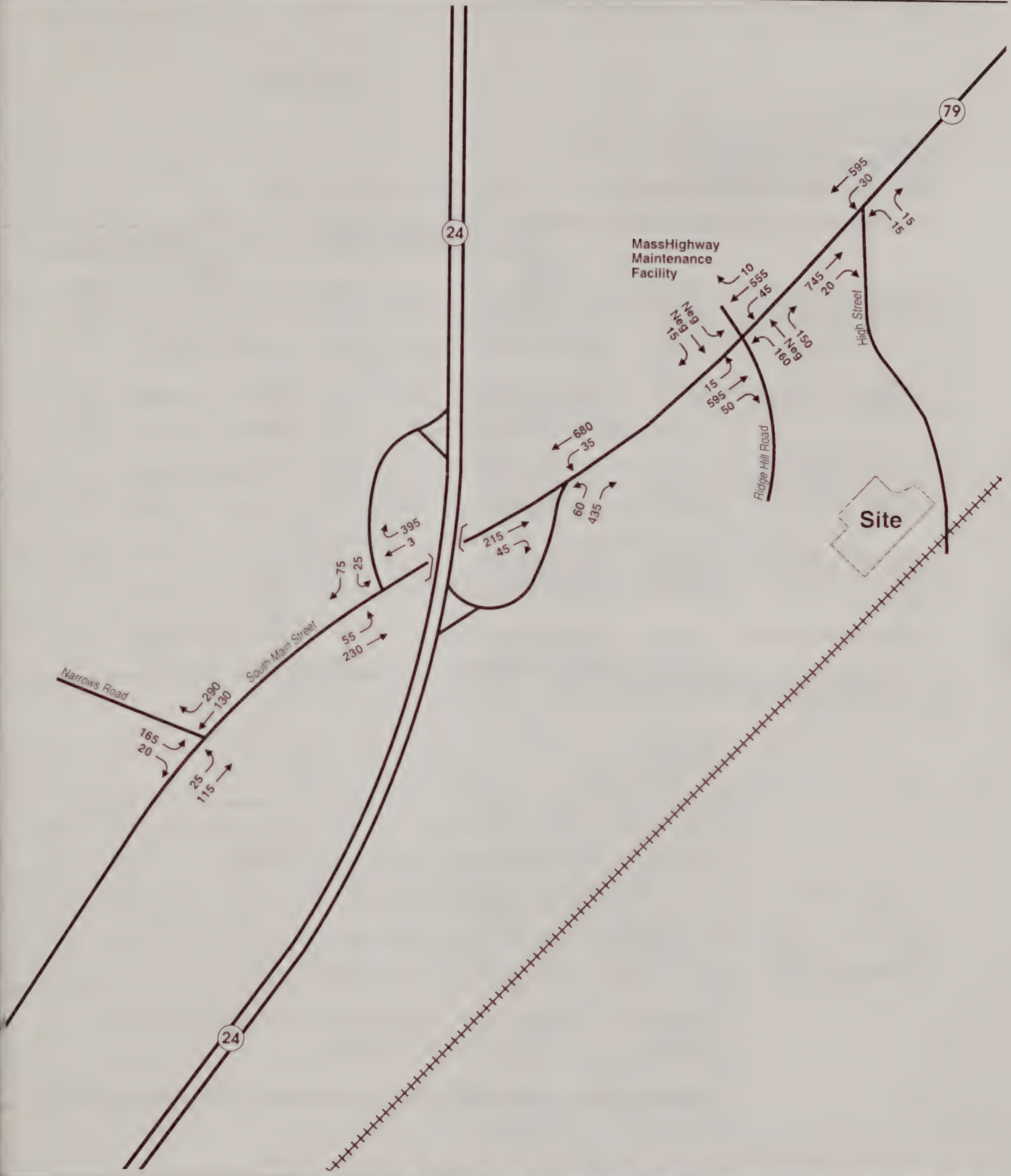
Measuring existing traffic volumes and projecting future traffic volumes quantifies traffic flow within the study area. To assess the quality of flow, roadway capacity analyses were conducted for 2010 No–Build and Build traffic conditions. Capacity analyses provide an indication of how well the roadway facilities meet the traffic demands placed on them. The resulting unsignalized intersection level–of–service analyses for both the 2010 No–Build Condition and 2010 Build Condition are summarized in Table 4.5–27.

As presented in that table, four of the five study area intersections will continue to operate at acceptable levels–of–service under both the No–Build and Build conditions. The only intersection that will experience capacity constraints is the South Main Street at Ridge Hill Road intersection. Since this intersection serves as the only access to the station, the volume of entering and exiting vehicles increases significantly over the 2010 No–Build Condition.



Freetown Station
2010 Build Morning Peak Hour
Traffic Volumes

Figure 4.5-17



Freetown Station
2010 Build Evening Peak Hour
Traffic Volumes

Figure 4.5-18

Table 4.5–27
Level – of – Service Summary
Freetown Station Study Area
2010 No–Build and Build Conditions

		2010 No–Build Condition			2010 Build Condition		
Unsignalized Intersections	Peak Hour	Critical Movement	Delay[1]	LOS[2]	Critical Movement	Delay	LOS
South Main St at High St	AM Peak	High St Movements	7	B	High St Movements	8	B
	PM Peak	High St Movements	13	C	High St Movements	17	C
South Main St at Ridge Hill Rd	AM Peak	Ridge Hill Rd Movements	11	C	Ridge Hill Rd Movements	22	D
	PM Peak	Ridge Hill Rd Movements	16	C	Ridge Hill Rd Movements	>60	F
South Main St. at Rte 24 NB Ramps	AM Peak	LT from Rte 24 Ramp	14	C	LT from Rte 24 Ramp	16	C
	PM Peak	LT from Rte 24 Ramp	12	C	LT from Rte 24 Ramp	16	C
South Main St. at Rte 24 SB Ramps	AM Peak	LT from Rte 24 Ramp	9	B	LT from Rte 24 Ramp	11	C
	PM Peak	LT from Rte 24 Ramp	10	C	LT from Rte 24 Ramp	13	C
South Main St at Narrows Rd	AM Peak	Narrows Rd Movements	6	B	Narrows Rd Movements	6	B
	PM Peak	Narrows Rd Movements	7	B	Narrows Rd Movements	8	B

1 Average intersection delay expressed in seconds per vehicle.
2 Level–of–service.

Mitigation

The only study area intersection that is projected to operate at LOS F during the Build condition is the intersection of South Main Street at Ridge Hill Road. Under the Existing, No–Build, and Build condition, the Ridge Hill Road approach was analyzed as one lane for both left and right turns. The addition of an exclusive right–turn lane along the Ridge Hill Road approach will improve traffic operations at this intersection significantly. This improvement will allow the right turn movements to exit without interference from the left–turning vehicles exiting Ridge Hill Road. The left–turn movements will continue to operate at LOS F during the 2010 Evening Peak Hour but the overall intersection delay will be reduced from 27 seconds to 11 seconds with the addition of the turning lane.

Mitigation measures at the other study area intersections are not foreseen at this time.

4.5.2.6 Other Stations

Traffic impacts associated with the stations south of Weir Junction were documented in the ENF, and are summarized here.

East Taunton

The traffic evaluation prepared for the East Taunton Station as part of the September 1995 MBTA New Bedford/Fall River Commuter Rail Project filing included the traffic generated by the Taunton Depot Retail development proposal. This development was proposed for the same site as the West Wind Industrial Park project (EOEA #6608).

The traffic study prepared by the MBTA for the proposed East Taunton Station site included the projected trip generation and distribution for the Taunton Depot Retail development project in both the No-Build and Build Condition traffic networks. The projected traffic impacts of the Taunton Depot Retail development project were documented a traffic impact study prepared by Bruce Campbell and Associates. Trip generation for the Taunton Depot Retail project was based on development of 340,000 square feet of retail space. Standard trip generation rates reported for Land Use Code 820 (Shopping Center) in the Institute of Transportation Engineers (ITE) Trip Generation Manual were employed by BCA. In comparing the trip generation rates for the two developments, the trip generation expected by the retail development is less during the morning peak hour and greater during the evening peak hour when compared with the trip generation projected for the industrial park project.

Actual development of the Taunton Depot Retail project differed from the initial plan of a 340,000 square foot shopping center. A Home Depot has been built, a Target Store is currently being built, and a Wendy's fast food restaurant is planned. Discussions with theTaunton City Planner indicated that the Home Depot is approximately 115,000 square feet (+/-5,000) and the Wendy's is approximately 3,000-4,000 square feet. The Target Store is 127,000 square feet. Since the entire site was previously permitted for the 340,000 sf retail use, no further traffic impact studies were required for the Home Depot, Target, and Wendy's development, which comprise 246,000 square feet. Based on the above square footages, trip generation for these three developments was projected and compared with the trip generation projections of the original Taunton Depot Retail project as well as the West Wind Industrial Park. Table 4.5-28 presents a summary of this comparison.

Table 4.5-28
East Taunton Commuter Rail Station Trip Generation Comparisons

Development Scenario	Total Trips Morning Peak Hour (vph)	 Evening Peak Hour (vph)
West Wind Industrial Park	714	1,432
Taunton Depot (Shopping Center)	429	1,876
Home Depot/Target/Wendy's	300[2]	1,016

[1] (vph) = vehicles per hour

[2] Adjusted to account for lack of breakfast service provided at Wendy's

As indicated in the above table, the traffic generated by the Home Depot/Target/Wendy's development is projected to be less than the shopping center development during both the weekday morning and evening peak hours. The ITE trip generation rates used for the Wendy's restaurant is high because the ITE trip rates for fast food restaurants include facilities with breakfast hours. Currently, Wendy's restaurants are not open during the breakfast hours. Consequently, the restaurant is not projected to generate any traffic during the weekday morning peak hour. As a result, the projected morning peak hour volumes associated with the Home Depot/Target/Wendy's development was adjusted from 502 to 300 vehicles per hour. This number is considerably less than the 429 vehicle trips that were distributed on the 2005 No-Build morning peak hour network for the 1995 MBTA East Taunton Station site traffic report (using the Taunton Depot Retail project traffic projections).

The 1995 study prepared by the MBTA for the proposed East Taunton Station site has adequately considered the development of the Taunton Depot Retail project. In fact, the station traffic impact study presents a conservative estimate when considered with the substantially fewer trips expected to be generated by the current Taunton Depot Retail development project.

Fall River

The Fall River Commuter Rail Station is predicted to affect traffic operations at two local intersections. The MBTA proposes to retime the existing signals at President Avenue and North Main Street, and at the GAR Highway/Riverside Avenue intersection to improve operations.

New Bedford

Several local intersections are predicted to operate at unacceptable levels with the proposed commuter rail station. Signal timing modifications would be provided at

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the intersections of Coggleshall Street with Ashley Boulevard and Acushnet Avenue. Intersection improvements are required at the following intersections:

- Coggleshall Street at North Front Street
- Logan and Purchase Streets
- Logan Street and Herman Melville Boulevard
- Hillman Street at Purchase Street

4.5.3 Grade Crossings

The existing grade crossings located along the Stoughton Branch were investigated as part of the New Bedford/Fall River Commuter Rail Project. This segment runs from Brock Street in Stoughton through the towns of Easton, Raynham, and Taunton,where it connects with the Attleboro Secondary at Weir Junction. The location of each existing crossing is shown in Figures 2.3-1 and 2.3-2.

Grade crossings along the New Bedford Main Line and Fall River Secondary were described in detail in the ENF and supporting documents.

This section provides a description of each of the proposed grade crossings, including the traffic conditions at the crossing and at nearby intersections and recommended treatments for grade crossing warning and protection. Four different treatments are recommended:

- **Standard.** Most of the grade crossings along the Stoughton Branch will require standard improvements such as railroad crossing gates and warning lights, advance warning signs, pavement markings, driveway reconfiguration, and clearing of vegetation near the crossing. Some of these crossings may also require minor geometric modifications to the roadway.
- **Traffic Signal Pre–emption.** Some of the crossings will require the installation of railroad pre–empted traffic signals at intersections near the crossing in addition to the standard improvements described above.
- **Gated Crossing.** A few of the crossings along the Stoughton Branch are low volume, privately maintained crossings. At these locations, installation of a gate with lock and key or keypad access at the crossing is recommended.
- **Consolidation/Closure.** Several grade crossings may be eliminated by consolidation. These crossings may be combined into one location because of safety issues and/or their close proximity to other crossings. This treatment would require construction of new roadways and/or shared driveways. We anticipate that several of the crossings could be closed with no other mitigation required.

Of the 26 grade crossings located along this line, 6 are in Stoughton, 12 are in Easton, 6 are in Raynham and 2 are in Taunton. Grade crossings on the Stoughton Branch are listed by milepost (MP), beginning at a milepost at 4.30 on Brock Street. These crossings are listed in Table 4.5–29, and a detailed description of each is provided in the Supplemental Information.

Table 4.5–29
Proposed Grade Crossings – Stoughton Branch

Location/Type	Milepost	Daily Traffic Volume (vpd)	Recommended Treatment
Stoughton			
Brock Street	4.30	2,700	Traffic Signal Pre–emption
Plain Street	4.60	7,200	Traffic Signal Pre–emption
Morton Street	5.20	1,400	Consolidation/Closure
Pearson's Crossing (private)	5.30	N/A	Consolidation/Closure
Private Drive (private)	5.40	N/A	Consolidation/Closure
Stoughton Rod & Gun Club (private)	5.60	N/A	Consolidation/Closure
Easton			
Elm Street	7.60	4,700	Standard
Oliver Street	7.80	900	Standard
Williams Street	8.30	N/A	Consolidation/Closure
Easton DPW Crossing (private)	8.65	N/A	Gated Crossing
Gary Lane (Easton Water Department) (private)	9.20	N/A	Gated Crossing
Short Street	9.55	4,000	Standard
Depot Street/Route 123	10.00	18,300	Standard
Purchase Street	10.20	2,600	Standard
Prospect Street	10.90	2,000	Standard
Country Club Crossing (private)	11.40	N/A	Closure
Foundry Street (Route 106)	11.80	10,900	Standard
Power Line Crossing (private)	12.40	N/A	Closure
Raynham			
Raynham/Taunton Greyhound Park (private)	13.90	N/A	Standard
Elm Street	15.40	400	Standard
Carver Street	15.80	5,700	Standard
Britton Street	16.50	400	Standard
King Phillip Street	17.10	3,300	Standard
East Britannia Street	18.10	3,800	Standard
Taunton			
Winter Street/Longmeadow Road	18.90	12,000	Standard
Dean Street (Route 44)	19.40	26,600	Traffic Signal Pre–emption

Traffic data collected during May 1998.

The following section explains how approximate vehicle delay and queue length were calculated at public grade crossings. The Grade Crossing Delay calculation sheet is included in the Supplemental Information.

Determination of Gate Closure Time

The impact of the grade crossing on traffic operations required the calculation of the amount of time the roadway would be blocked. The signal design team determined the roadway would be blocked for 30 seconds before the train arrives at the grade crossing and for 16 seconds after the train leaves the crossing. The amount of time the train is physically blocking the roadway was estimated by dividing the approximate length of the train by the approximate speed of the slowest train at that crossing. The sum of all of the time components yields the amount of time that the roadway is blocked.

Determination of Traffic Volumes

2010 morning and evening peak hour traffic volumes were determined for 17 public grade crossings by applying a 1 percent annual growth factor to the highest volume approach, based on 1998 observed volumes. Table 4.5-30 provides daily and peak volumes at public grade crossing.

Queue and Delay Calculation

The peak direction traffic volumes were converted to an arrival rate by dividing the hourly volume by the number of seconds in an hour (3600). By applying this arrival rate to the total time that the roadway was blocked, an average queue estimate was developed. Further calculation provided the average delay per stopped vehicle.

Assuming a random arrival of vehicles at the crossing, the average delay per stopped vehicle was estimated based on one-half of the total gate closure time plus the startup time for the vehicles in the queue. The average delay per stopped vehicle is best represented by the vehicle in the middle of the queue. Therefore, the start-up time is estimated to be two seconds per vehicle for every vehicle in the first half of the queue. Simply stated, the average delay is equal to one half of the time that the roadway is blocked plus two seconds per vehicle for one-half of the average queue. Table 4.5-30 provides queue and delay information for each of the public crossings.

Determination of Impact

After the average queue was calculated, impacts of the queue on nearby intersections was determined. The total number of vehicles queued was multiplied by 25-feet per vehicle in order to determine the total length of the queue.

Table 4.5-30
Traffic Impacts at Public Grade Crossings

Crossing	Traffic Volume (vpd)	AM Peak Volume	PM Peak Volume	Queue Length (feet)	Average Delay (seconds)
Stoughton					
Brock Street	2,700	230	300	100	34
Plain Street	7,200	545	650	200	36
Morton Street	1,400	110	160	50	29
Easton					
Elm Street	4,700	330	425	150	35
Oliver Street	900	70	90	50	30
Short Street	4,000	275	395	125	33
Depot Street	18,250	1,330	1,580	475	47
Purchase Street	2,600	170	220	75	31
Prospect Street	2,000	150	160	75	31
Foundry Street	10,900	740	970	250	39
Raynham					
Elm Street	400	25	45	25	29
Carver Street	5,700	465	505	150	35
Britton Street	400	25	35	25	29
King Phillip Street	3,300	240	305	100	30
East Brittania Street	3,800	270	360	100	31
Taunton					
Winter Street	12,000	900	1,000	300	45
Dean Street	26,000	1,740	2,010	600	57

4.5.3.1 Brock Street, Stoughton MP 4.30

Brock Street is a suburban collector roadway that extends from Morton Street southeasterly to Washington Street (Route 138). The railroad–highway grade crossing is located approximately 140 feet west of Washington Street (Route 138). The horizontal geometry is a tangent section for both approaches to the grade crossing with a south to east horizontal curve located approximately 340 feet west of the crossing. The roadway profile consists of slight rising grades on both approaches to the grade crossing with the track at the peak.

Traffic Impacts

Existing traffic volumes on Brock Street are moderate. The intersection with Washington Street (Route 138) is located to the east of the grade crossing. Traffic volumes on Washington Street are generally high, causing delays and queues on

Brock Street. Traffic waiting to turn onto Washington Street occasionally forms a queue over the grade crossing.

Recommended Treatment

In addition to a railroad signal with crossing gates, it is recommended that a traffic signal be installed at the Plain Street/Washington Street (Route 138) intersection and interconnected with the railroad signals. The traffic signal design will need to ensure that the track area is clear before crossing gates go down. Mast arms and signal heads may be required to the west of the crossing. Potential flattening of the crest over the track should also be investigated.

4.5.3.2 Plain Street, Stoughton MP 4.60

Plain Street is a minor arterial roadway that begins at Bay Road near the Sharon Town Line and runs northeasterly ending at Washington Street (Route 138) The railroad–highway grade crossing is located approximately 175 feet west of the intersection of Plain Street and Washington Street (Route 138).

The track has been removed at this location. A dirt path crosses the roadway at the location of the track bed. The right–of–way is used as parking for a bus maintenance facility located to the south and commercial development to the north.

Traffic Impacts

Traffic volumes on Plain Street are high. High traffic volumes on Washington Street cause delays and queues on Plain Street. Traffic waiting to turn onto Washington Street frequently forms a queue over the grade crossing.

Recommended Treatment

In addition to a railroad signal with crossing gates, a traffic signal would be installed at the Plain Street/Washington Street (Route 138) intersection and interconnected with the railroad signals. The traffic signal design will need to ensure that the track area is clear before crossing gates go down. Mast arms and signal heads may be required west of the crossing.

4.5.3.3 Morton Street, Stoughton MP 5.20

Morton Street is a residential roadway that begins in Stoughton Center and runs southeasterly through Stoughton ending at Washington Street (Route 138) The railroad–highway grade crossing is located approximately 25 feet west of the intersection of Morton Street and Washington Street (Route 138).
safety problems in wet or snowy weather. There is insufficient storage for vehicles turning from Washington Street (Route 138) onto Morton Street.

Traffic Impacts

Traffic volumes on Morton Street are low.
The intersection with Washington Street (Route 138) is located 25 feet to the east of the grade crossing. Traffic volumes on Washington Street are high making turning movements out of Morton Street difficult. Since traffic volumes on Morton Street are low, queues of more than one or two vehicles are infrequent; however, queues of more than two vehicles will block the grade crossing.

Recommended Treatment

Several alternatives were considered to improve sight distances and clearance at the tracks, as well as protect the safety of the private driveway crossings. After review of these options, the MBTA recommends that a roadway connecting Morton Street and Totham Farm Road be constructed west of the railroad right-of-way. This roadway would have a grade-separated crossing at Totham Farm Road, and would provide access to the private driveways.

4.5.3.4 Pearson's Crossing, Stoughton MP 5.30

Pearson's Crossing is a private driveway providing access to a farm located on the west side of the railroad tracks. The railroad–driveway grade crossing is located approximately 20 feet west of Washington Street (Route 138).

Traffic Impacts

The traffic volumes entering and exiting the driveway are low, however, there is insufficient storage between the railroad track and Washington Street (Route 138) for even one vehicle indicating that vehicles turning into the driveway may not be able to clear the street when the train is crossing the driveway.

Recommended Treatment

This crossing would be consolidated with the other private crossings to the south and Morton Street. Any improvement concept developed for the Morton Street crossing should also address Pearson's Crossing.

4.5.3.5 Private Drive, Stoughton MP 5.40

This crossing is a private driveway providing access to several houses located to the west of the railroad tracks. The railroad–driveway grade crossing is located approximately 25 feet west of Washington Street (Route 138).

Traffic Impacts

The traffic volumes entering and exiting the driveway are low, however, there is insufficient storage between the railroad track and Washington Street (Route 138) for even one vehicle indicating that vehicles turning into the driveway may not be able to clear the street when the train is crossing the driveway.

Recommended Treatment

This crossing would be consolidated with the other private crossings to the south and Morton Street. Any improvement concept developed for the Morton Street crossing should also address the Private Drive Crossing.

4.5.3.6 Stoughton Rod & Gun Club, Stoughton MP 5.60

This crossing is a private driveway providing access to the Stoughton Rod & Gun Club located on the west side of the railroad tracks. The railroad–driveway grade crossing is located approximately 30 feet west of Washington Street (Route 138).

Traffic Impacts

The traffic volumes entering and exiting the driveway are low but are the highest of any of the private driveways along the line in Stoughton. There is insufficient storage between the railroad track and Washington Street (Route 138) for more than one vehicle indicating that vehicles turning into the driveway may not be able to clear the street when the train is crossing the driveway.

Recommended Treatment

This crossing would be consolidated with the other private crossings to the south and Morton Street. Any improvement concept developed for the Morton Street crossing should also address the Stoughton Rod & Gun Club Driveway.

4.5.3.7 Elm Street, Easton MP 7.60

Elm Street is a minor arterial roadway that begins at North Main Street and runs easterly to Pearl Street in Brockton. The railroad–highway grade crossing is located approximately 215 feet west of the intersection of Elm Street and Oliver Street.

Traffic Impacts

Traffic volumes on Elm Street are moderate. Anticipated vehicle queues may affect the two nearby intersections, but these roadways have low traffic volumes. Queues may also affect a few driveways near the crossing. Of particular concern is the driveway to the office/industrial building on the east side of the crossing. Depending upon the location of the track within the right–of–way, this driveway may need to be relocated further to the east.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. Some clearing of vegetation may be required on the north side of the street to improve the sight lines to the crossing and railroad warning signals.

4.5.3.8 Oliver Street, Easton MP 7.80

Oliver Street is a minor local roadway that begins at North Main Street and runs northeasterly ending at Elm Street. The railroad–highway grade crossing is located approximately 100 feet west of the intersection of Oliver Street and Mechanic Street.

Traffic Impacts

Traffic volumes on Oliver Street are low. Maximum queue lengths during peak periods may affect a few driveways near the crossing. Of particular concern is the driveway to the office/industrial building on the northwest side of the crossing and the entrance to the historic train station. Depending upon the location of the track within the right–of–way, these driveways may need to be relocated or closed.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings.

4.5.3.9 Williams Street, Easton MP 8.30

Williams Street is a minor local roadway that begins at Main Street and runs southwesterly ending a Center Street. Williams Street is closed at the crossing and is used as a pedestrian path. East of the crossing, Williams Street provides access to a few houses. The railroad grade crossing is located approximately 150 feet west of the intersection of Williams Street and Bridge Street.

Traffic Impacts

There are no traffic impacts associated with re–activation of the Williams Street crossing.

Recommended Treatment

It is recommended that this crossing be closed and fenced on both sides. Access to this area is provided by the Bridge Street grade–separated crossing located approximately 500 feet south of Williams Street.

4.5.3.10 Easton Department of Public Works, Easton MP 8.65

The Easton Department of Public Works (DPW) maintains a crossing behind their facility used to access the right–of–way and a brush dumping area. This crossing is gated and appears to be infrequently used. Closing this crossing should be investigated. If this crossing is to remain, it should be properly gated with access via a lock–and–key or keypad assembly.

4.5.3.11 Gary Lane (Easton Water Department), Easton MP 9.20

The Easton Water Department maintains a crossing at the end of Gary Lane to access the town well fields. General traffic is not permitted beyond the railroad right–of–way. This crossing is gated with the gate located on the opposite side of the crossing. The current gated access should be relocated to the west side of the crossing. The railroad right–of–way should be fenced for a distance of 1000 feet on either side of the crossing given the close proximity of several residential properties.

4.5.3.12 Short Street, Easton MP 9.55

Short Street is a minor residential roadway that begins at Center Street and runs southeasterly to Central Street (Route 123). The railroad–highway grade crossing is located approximately 0.2 miles east of the intersection of Short Street and Center Street.

Traffic Impacts

Traffic volumes on Short Street are moderate Queues may affect the driveways immediately on either side of the crossing.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. Clearing of vegetation may be necessary to ensure adequate sight distance to the crossing.

4.5.3.13 Depot Street (Route 123), Easton MP 10.00

Depot Street (Route 123) is a state highway that begins at Bay Road and Foundry Street and runs northeasterly to Turnpike Street. The railroad–highway grade crossing is located approximately 0.25 miles east of the intersection of Depot Street (Route 123) and Center Street.

Traffic Impacts

Traffic volumes on Depot Street (Route 123) are high. During peak periods, the predicted long queues may affect the commercial and residential driveways immediately on either side of the crossing.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. Clearing of vegetation may be necessary to ensure adequate sight distance to the crossing. The foundry driveway may fall within the railroad right–of–way and may need to be relocated when the track is restored through this area.

4.5.3.14 Purchase Street, Easton MP 10.20

Purchase Street is an arterial roadway that begins at Depot Street (Route 123) and runs southeasterly to Washington Street (Route 138). The railroad–highway grade crossing is located approximately 0.25 miles east of the intersection of Depot Street (Route 123) and Purchase Street.

Traffic Impacts

Traffic volumes on Purchase Street are moderate. Train service will result in short queues and minimal delay times.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. Clearing of vegetation near the crossing may be necessary to ensure adequate sight distance to the crossing. The crest curve to the west of the crossing should be lowered to provide adequate sight distance to the crossing.

4.5.3.15 Prospect Street, Easton MP 10.90

Prospect Street is a collector roadway that begins at Bay Road and runs northeasterly to Purchase Street. The railroad–highway grade crossing is located approximately 0.3 miles south of the intersection of Prospect Street and Purchase Street.

Traffic Impacts

Traffic volumes on Prospect Street are moderate. Queues at this location during peak periods may affect the driveways on both sides of the crossing.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. Clearing of vegetation may be necessary to ensure adequate sight distance to the crossing.

4.5.3.16 Country Club Crossing MP 11.40

Country Club Crossing is a low–volume crossing located at milepost 11.40. General traffic is not permitted beyond the railroad right–of–way. The crossing at this location should be permanently closed. No traffic mitigation is expected.

4.5.3.17 Foundry Street (Route 106), Easton MP 11.80

Foundry Street (Route 106) is a state highway and begins at the Norton town line and runs easterly to the West Bridgewater town line. The railroad–highway grade crossing is located approximately 0.75 miles east of the intersection of Foundry Street and Prospect Street.

Traffic Impacts

Traffic volumes on Foundry Street (Route 106) are high. The predicted maximum queue lengths of 250 feet and average delays of 39 seconds during peak periods may affect the residential driveway located 100 feet to the east.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. Clearing of vegetation may be necessary to improve sight distance to the crossing.

4.5.3.18 Power Line Crossing MP 12.40

High voltage power lines cross the railroad right–of–way at milepost 12.40. Access for utility vehicles is provided at this location. General traffic is not permitted. Closing this crossing should be investigated. If this crossing is to remain, it should be properly gated with access via a lock–and–key or keypad assembly. No traffic mitigation is expected.

4.5.3.19 Raynham/Taunton Greyhound Park, Raynham MP 13.90

The Raynham/Taunton Greyhound Park maintains a private crossing over the railroad right–of–way. The crossing provides access from the main portion of their facility on the east side of the railroad to a truck maintenance facility and a training track. The railroad–driveway grade crossing is located approximately 0.25 miles east of Broadway (Route 138).

Traffic Impacts

Traffic volumes on the driveway are low and the delay and queuing impacts of train crossings are expected to be minimal at this location.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. The profile of the driveway may need to be lowered to allow the railroad and roadway to meet.

4.5.3.20 Elm Street, Raynham MP 15.40

Elm Street is a local residential roadway that begins at Hill Street and continues to North Main Street. The railroad–highway grade crossing is located approximately 0.30 miles west of the intersection of Elm Street and Broadway (Route 138).

Traffic Impacts

Traffic volumes on Elm Street are low. Maximum queue lengths of 25 feet and average delays of 29 seconds predicted at this location during peak periods could affect the residential driveway located 35 feet to the west of the crossing.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. Clearing of vegetation may be necessary to improve sight distance to the crossing.

4.5.3.21 Carver Street, Raynham MP 15.80

Carver Street is an arterial roadway that begins at Hill Street and continues to Oak Street. The railroad–highway grade crossing is located approximately 900 feet west of the intersection of Carver Street and Broadway (Route 138).

Traffic Impacts

Traffic volumes on Carver Street are moderate. Maximum queue lengths of 150 feet and average delays of 35 seconds are expected, and may affect the residential driveway located 70 feet to the west of the crossing.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. Clearing of vegetation may be necessary to improve sight distance to the crossing.

4.5.3.22 Britton Street, Raynham MP 16.50

Britton Street is a local residential roadway that begins at King Philip Street and continues easterly to Center Street. The railroad–highway grade crossing is located approximately 290 feet west of the intersection of Broadway (Route 138) and Britton Street.

Traffic Impacts

Traffic volumes on Britton Street are low. Maximum queue lengths of 25 feet and average delays of 29 seconds are predicted at this location during peak periods, and may affect the residential driveways around the crossing.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. Clearing of vegetation may be necessary to improve sight distance to the crossing.

4.5.3.24 King Philip Street, Raynham MP 17.10

King Philip Street is a local residential roadway that begins at Prospect Street and continues southeasterly to South Main Street. The railroad–highway grade crossing is located approximately 375 feet west of the intersection of the access road to the King Philip Apartments.

Traffic Impacts

Traffic volumes on King Philip Street are moderate. Maximum queue lengths of 100 feet and average delays of 30 seconds are predicted at this location during peak periods, and may affect the residential driveways around the crossing.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. Clearing of vegetation may be necessary to improve sight distance to the crossing. The driveway to the single family home using the track bed will need to be relocated. Initial field investigations indicate that this driveway may be relocated to the west of the right–of–way, or may connect to a subdivision under construction to the east of the crossing. If the driveway is connected to the subdivision, a gated private crossing will need to be provided. The access rights of this property will need to be fully investigated.

4.5.3.24 East Britannia Street, Raynham MP 18.10

East Britannia Street is a local residential roadway that begins at Broadway (Route 138) and continues easterly to Thrasher Street. The railroad–highway grade crossing is located approximately 460 feet east of the intersection of East Britannia Street and Thrasher Street.

Traffic Impacts

Traffic volumes on East Britannia Street are moderate. Maximum queue lengths of 100 feet and average delays of 31 seconds are predicted at this location during peak periods, and are not expected to affect any driveways or intersections.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. Clearing of vegetation will be necessary to improve sight distance to the crossing.

4.5.3.25 Winter Street/Longmeadow Road, Taunton MP 18.90

Winter Street/Longmeadow Road is an arterial roadway that begins at Washington Street and continues southeasterly to Dean Street. The railroad–highway grade crossing is located approximately 0.75 miles northwest of the intersection of Longmeadow Road and Dean Street.

Traffic Impacts

Traffic volumes on Winter Street/Longmeadow Road are high with a daily traffic volume of approximately 12,000 vehicles per day (vpd). Maximum queue lengths of 300 feet and average delays of 45 seconds are predicted at this location during peak periods, and may affect the commercial driveways around the crossing.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. Clearing of vegetation may be necessary to improve sight distance to the crossing.

4.5.3.26 Dean Street (Route 44), Taunton MP 19.40

Dean Street (Route 44) is a state highway that begins at Church Green and continues easterly to Cape Highway. The railroad–highway grade crossing is located approximately at the intersection of Dean Street and Arlington Street.

Traffic Impacts

Traffic volumes on Dean Street (Route 44) are high with a daily traffic volume of approximately 26,600 vehicles per day (vpd). Maximum queue lengths of 600 feet and average delays of 57 seconds are predicted at this location during peak periods, which may affect the driveways around the crossing as well as traffic operations at the adjacent intersection with Arlington Street.

Recommended Treatment

Railroad crossing gates and signals are recommended at this location in addition to advance warning signs and pavement markings. The existing traffic signal should be upgraded or replaced with a railroad pre–empted traffic signal to enable coordinated phasing of traffic and train movements.

4.5.3.27 Grade Crossings South of Weir Junction

Grade crossings along the Attleboro Secondary, the New Bedford Main Line, and the Fall River Secondary were documented in detail in the 1995 ENF and supporting documents. There are 22 grade crossings along these active freight rail lines. Grade crossing protection and warning systems will be upgraded at all grade crossings. Modifications to the grade crossing and adjacent intersections are recommended at Myricks Street in Berkely and at Tarkiln Road in New Bedford.

4.5.4 Summary

The traffic analysis of the proposed New Bedford/Fall River Commuter Rail Extension included a detailed evaluation of the traffic impacts of each of the commuter rail stations located on the Stoughton Branch, and those stations south of Taunton that were relocated subsequent to the ENF. Traffic conditions in the vicinity of each station were analyzed for existing conditions and future 2010 conditions with and without the project. The MBTA is committed to developing and implementing mitigation for roadways and intersections that would be most impacted by the proposed commuter rail station traffic. In cases where project-generated traffic results in a degradation of operating conditions when compared to the No-Build conditions, all reasonable and feasible mitigation measures were evaluated and are proposed to address these impacts. At the North Easton and Raynham stations the intersections will operate at unacceptable levels of service in the future even without the commuter rail project traffic. Mitigation to bring these intersections up to acceptable levels has been presented, however, the station traffic will be only a small part of the problem at many of the study area intersections. Mitigation measures are proposed for the following intersections along the Stoughton Branch, in addition to those proposed for the New Bedford and Fall River stations:

- Route 138 at Main Street (Easton)
- Route 138 at Route 123 (Easton)
- Route 138 at Union Street (Easton)
- Route 138 at Elm Street (Easton)
- Route 138 at Route 106 (Raynham)
- Ridge Hill Road at South Main Street (Freetown)

The analysis of traffic impacts also included an assessment of the 26 highway-railroad grade crossings along the Stoughton Branch. This analysis shows that the impacts of the proposed project will be minimal. The average delay of vehicles stopped at grade crossings when a commuter rail train is passing is estimated to be less than 40 seconds at all intersections except those with the highest traffic volumes (Depot Street [Route 123], Easton; Winter Street and Dean Street [Route 44], Taunton). Mitigation measures, such as railroad crossing signing, advance pavement markings, and advance signing, are recommended at many grade crossings to improve safety.

4.6 Air Quality

An air quality study was undertaken to evaluate air quality impacts of the proposed MBTA New Bedford/Fall River Commuter Rail Extension. The air quality study was conducted in compliance with Massachusetts Department of Environmental Protection (DEP) guidelines and includes a microscale (localized) analysis of selected intersections in the vicinity of the proposed stations and a mesoscale (regional) analysis of benefits of the new commuter-related rail operations to/from Boston. These analyses were conducted for the existing and future year conditions to demonstrate that the proposed project complies with the 1990 Clean Air Act Amendments (CAAA) and Massachusetts State Implementation Plan (SIP) criteria. This study specifically address the air quality benefits and impacts associated with the Stoughton Alternative and it contrasts them to the Attleboro Alternative as presented in the ENF.

4.6.1 Methodology

The CAAA resulted in states being divided into attainment and nonattainment areas, with classifications based upon the severity of their air quality problem. The project is located in an area the U.S. Environmental Protection Agency (EPA) has designated as attainment for carbon monoxide (CO) and as nonattainment for ozone with a classification of "Serious".

The National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO) and ozone have been set by the EPA to protect the public health. The Commonwealth of Massachusetts has adopted the same standards as those set by the EPA. The NAAQS for CO is 35 parts per million (ppm) for a 1-hour period and 9 ppm for an 8-hour period, each not to be exceeded more than once per year. For ozone, the NAAQS is 0.08 parts per million for an 8-hour period, based on the third highest daily maximum ozone level averaged over a continuous three year period.

The predominant sources of air pollution anticipated from the proposed MBTA New Bedford/Fall River Commuter Rail project include emissions of CO, nitrogen oxides (NOx), and volatile organic compounds (VOC) from locomotive engines and from motor vehicles traveling to and from the train stations. Carbon monoxide emissions are emitted predominantly by motor vehicles. The impacts of CO are estimated in the microscale analysis by modeling CO concentrations at congested locations, typically intersections, and comparing the results to the NAAQS. Locomotives and vehicles do not directly emit ozone, but it is formed through a complex chemical process that occurs when ozone precursor emissions (NOx and VOCs) react in the presence of sunlight and heat. The ozone impacts due to the proposed project eliminating vehicle trips were evaluated by assessing changes in ozone precursor emissions in the mesoscale analysis and comparing the results to the CAAA and SIP criteria.

The DEP has developed guidelines[49] to ensure that proposed projects satisfy the CAAA and Massachusetts State Implementation Plan (SIP) requirements. The DEP guidelines require that proposed projects located in CO nonattainment areas demonstrate that no violations of the CO NAAQS will be created in areas where no violations currently exist, and that CO reductions will be achieved in areas where violations currently exist. The DEP guidelines also require a mesoscale analysis to determine if VOC emissions increase during the Build Condition as compared to the No-Build Condition. If the proposed project results in an increase in VOC emissions, the DEP guidelines require that all reasonable and feasible VOC reduction and mitigation measures be implemented.

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[49] Guidelines For Performing Mesoscale Analysis of Indirect Sources, Massachusetts Department of Environmental Protection - Division of Air Quality Control, May 1991.

4.6.1.1 Microscale Analysis

The microscale analysis evaluated CO impacts at three intersections that will be impacted by station-related traffic and/or that represent the highest congestion locations in the vicinity of the proposed stations. Compliance with NAAQS for CO at these three modeled intersections indicates compliance at less congested intersections elsewhere in the vicinity of the proposed station sites. Intersections selected for microscale air quality modeling were ranked following procedures outlined by the EPA in Guidelines For Modeling Carbon Monoxide From Roadway Intersections[50], and as referenced in the DEP guidelines.

The EPA's CAL3QHC[51] Version 2 computer model was used to predict concentrations of CO at the selected receptor locations. The CAL3QHC dispersion model calculates the air quality impacts from vehicles in both free-flow and idle operation by creating a three dimensional model that represents the roadway and receptor geometry. All of the vehicle emission factors used in the microscale analyses were obtained using the EPA MOBILE5a-h[52] computer model. The MOBILE5a-h emission factors were adjusted to reflect Massachusetts-specific conditions such as state vehicle registration age data, the statewide Inspection and Maintenance Program, and the Stage II Vapor Recovery System. A detailed discussion of the microscale modeling procedures and MOBILE5a-h input data are presented in the Air Quality Technical Report.

The following intersections were selected for microscale air quality modeling:

- Main Street and Route 138 (Washington Street), Easton
- Route 106 (Foundry Street) and Route 138 (Turnpike Street), Raynham
- Route 44 (Dean Street) and Longmeadow Road, Taunton

The intersections modeled in the analysis are shown in Figure 2.3-2.

4.6.1.2 Mesoscale Analysis

The predominant sources of regional pollution impacts anticipated from the proposed New Bedford/Fall River Commuter Rail Extension are emissions from locomotive engines during line-haul operations and idling operations, and reductions in emissions resulting from modal travel shifts from private automobiles to commuter rail service.

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[50] Guidelines For Modeling Carbon Monoxide From Roadway Intersections, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Technical Support Division; Research Triangle Park, NC; EPA-454/R-92-005; November 1992

[51] User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Technical Support Division; Research Triangle Park, NC; EPA-454/R-92-006; November 1992.

[52] The November 21, 1995 release of MOBILE5a-h (Mobile Source Emission Factor Model), US EPA, Office of Mobile Sources, Ann Arbor, MI.

The objective of the mesoscale analysis was to estimate the change in area-wide emissions of ozone precursors (NOx and VOCs) during a typical day in the ozone season (summer) by implementing the proposed commuter rail service. The mesoscale study area includes the major highways that would experience a reduction in commuter traffic due to a modal shift to train travel. Vehicle emissions within the study area were estimated by conducting a pollution-burden analysis utilizing the volume of vehicle trips that are expected to be eliminated, lengths of roadways, and vehicle emission rates. Train emissions were calculated utilizing the scheduled train trips, length of track, and locomotive engine emission rates. The mesoscale analysis evaluated the change in emissions due to the changes in these parameters.

A detailed discussion of the mesoscale modeling procedures and MOBILE5a-h input data are presented in the Air Quality Technical Appendix.

4.6.2 Commuter Rail Stations (Microscale Analysis) and Layover Facilities

This section provides a microscale (localized) analysis of air quality impacts associated with each of the commuter rail stations and layover facilities on the Stoughton Branch.

4.6.2.1 North Easton Station

The intersection of Main Street and Route 138 (Washington Street) was selected for evaluation in the microscale analysis based upon the EPA and DEP guidelines. This intersection represents one of the three highest volume and congested intersection studied as part of the traffic evaluation for the proposed stations.

Receptor locations at the Main Street and Route 138 (Washington Street) intersection were selected based on land use considerations and were placed where the public has access. Twenty receptor locations were placed at the selected study intersections to ensure that the maximum CO concentrations would be identified.

Impacts

A microscale analysis was conducted for the 1998 Existing and 2010 No-Build and Build conditions to demonstrate that the proposed MBTA New Bedford/Fall River Commuter Rail project complies with the CAAA and SIP criteria. The maximum predicted 1-hour and 8-hour concentrations for the Existing, No-Build, and Build conditions are presented in Table 4.6-1. These results represent maximum predicted CO concentrations at only the most critical receptor(s) at the study intersection (i.e., highest predicted CO concentrations). The microscale modeling results for all receptor locations are provided in the Air Quality Technical Report Appendix.

Table 4.6-1
Predicted Maximum CO Concentrations - *
North Easton Station

Receptor Number**	Period	1998 Existing	2010 No-Build	2010 Build
17	1-Hour	9.1	6.9	7.0
	8-Hour	6.0	4.6	4.6

* The concentrations are expressed in parts per million (ppm) and include 1-hour and 8-hour background concentrations of 5.0 ppm and 3.3 respectively. The 1-hour and 8-hour NAAQS for CO is 35 ppm and 9 ppm, respectively.

** Refer to Figure 2.3-2 for location of receptors.

The predicted maximum CO levels for the 1998 Existing 1-hour analysis ranged from 6.7 ppm to a maximum of 9.1 ppm (receptor 17) at the Main Street and Route 138 intersection. These values are well below the 1-hour CO NAAQS of 35 ppm. Maximum CO values for the corresponding 8-hour analysis were predicted to be at 6.0 ppm or lower, also below the 8-hour CO NAAQS of 9 ppm.

The results of the 2010 No-Build and Build alternatives indicate that reductions in CO levels (averaging 10 to 20 percent) are expected compared to the 1998 Existing conditions. These results can be attributed to lower vehicle emissions due to newer (i.e., cleaner and more efficient) motor vehicles with improved motor vehicle emissions control technologies, fleet vehicle turnover, and Massachusetts emission control programs. Table 4.6-1 presents the maximum CO levels for the 2010 No-Build 1-hour and 8-hour conditions, which are predicted to be 6.9 ppm and 4.6 ppm, respectively. These levels are below the CO NAAQS.

The results of the 2010 Build alternative are also predicted to be below the NAAQS. Table 4.6-1 presents the maximum CO concentrations at the Main Street and Route 138 intersection, which are predicted to be 7.0 ppm or lower for the 1-hour condition, and 4.6 ppm or lower for the 8-hour condition. The station-related traffic increases are expected to result in only minor (0.5 ppm or lower) increases in CO levels compared to the No-Build conditions.

4.6.2.2 Raynham Station

The intersection of Route 106 (Foundry Street) and Route 138 (Turnpike Street) was selected for evaluation in the microscale analysis based upon the EPA and DEP guidelines. This intersection represents one of the three highest volume, highest congestion study intersections among the array of intersections studied as part of the traffic evaluation for the proposed stations.

Receptor locations at the Route 106 (Foundry Street) and Route 138 (Turnpike Street) intersection were selected based on land use considerations and were placed where the public has access. A total of 20 receptor locations were placed at the selected study intersection to ensure that the maximum CO concentrations would be identified. The intersections and receptor locations used in the analysis are shown in Figure 2.3-2.

Impacts

A microscale analysis was conducted for the 1998 Existing and 2010 No-Build and Build conditions to demonstrate that the proposed MBTA New Bedford/Fall River Commuter Rail project complies with the CAAA and SIP criteria. The maximum predicted 1-hour and 8-hour concentrations for the Existing, No-Build, and Build conditions are presented in Table 4.6-2. These results represent maximum predicted CO concentrations at only the most critical receptor(s) at the study intersection (i.e., highest predicted CO concentrations). The microscale modeling results for all receptor locations are provided in the Air Quality Technical Report Appendix.

Table 4.6-2
Predicted Maximum CO Concentrations - *
Raynham Station

Receptor Number**	Period	1998 Existing	2010 No-Build	2010 Build
2	1-Hour	9.9	7.1	7.0
	8-Hour	6.5	4.7	4.6

* The concentrations are expressed in parts per million (ppm) and include 1-hour and 8-hour background concentrations of 5.0 ppm and 3.3 respectively. The 1-hour and 8-hour NAAQS for CO is 35 ppm and 9 ppm, respectively.

** Refer to Figure 2.3-2 for location of receptors.

The predicted maximum CO levels for the 1998 Existing 1-hour analysis ranged from 7.1 ppm to a maximum of 9.9 ppm (receptor 2) at the Route 138 and Route 106 intersection. These values are well below the 1-hour CO NAAQS of 35 ppm. Maximum CO values for the corresponding 8-hour analysis were predicted to be at 6.5 ppm or lower, also below the 8-hour CO NAAQS of 9 ppm.

The results of the 2010 No-Build and Build alternatives indicate that reductions in CO levels (averaging 10 to 20 percent) are expected compared to the 1998 Existing conditions. These results can be attributed to lower vehicle emissions due to newer (i.e., cleaner and more efficient) motor vehicles with improved motor vehicle emissions control technologies, fleet vehicle turnover, and Massachusetts emission control programs. As presented in Table 4.6-2, the maximum CO levels for the 2010 No-Build 1-hour and 8-hour conditions are predicted to be 7.1 ppm and 4.7 ppm, respectively. These levels are below the CO NAAQS.

The results of the 2010 Build alternative are also predicted to be below the NAAQS (Table 4.6-2) Maximum CO concentrations at the Route 138 and Route 106 intersection are predicted to be 7.0 ppm or lower for the 1-hour condition and 4.6 ppm or lower for the 8-hour condition. The station-related traffic increases are expected to result in only minor (0.1 ppm or lower) increases in CO levels compared to the No-Build conditions.

4.6.2.3 Dean Street, Taunton Station

The intersection of Route 44 (Dean Street) and Longmeadow Road was selected for microscale analysis following the EPA and DEP guidelines. This intersection represents one of the three highest volume, highest congestion study intersections among the array of intersections studied as part of the traffic evaluation for the proposed stations.

Receptor locations at these intersections were selected based on land use considerations. A total of 20 receptor locations were placed at the selected study intersection to ensure that the maximum CO concentrations would be identified. The intersections and receptor locations used in the analysis are shown in Figure 2.3-2.

Impacts

A microscale analysis was conducted for the 1998 Existing and 2010 No-Build and Build conditions to demonstrate that the New Bedford/Fall River Commuter Rail project complies with the CAAA and SIP criteria. The maximum predicted 1-hour and 8-hour concentrations for the Existing, No-Build, and Build conditions are presented in Table 4.6-3. These results represent maximum predicted CO concentrations at only the most critical receptor(s) at the study intersection (i.e., highest predicted CO concentrations). The microscale modeling results for all receptor locations are provided in the Air Quality Technical Report Appendix.

Table 4.6-3
Predicted Maximum CO Concentrations - *
Dean Street, Taunton Station

Receptor Number**	Period	1998 Existing	2010 No-Build	2010 Build
1	1-Hour	9.9	7.3	7.4
	8-Hour	6.5	4.8	4.9

* The concentrations are expressed in parts per million (ppm) and include 1-hour and 8-hour background concentrations of 5.0 ppm and 3.3 respectively. The 1-hour and 8-hour NAAQS for CO is 35 ppm and 9 ppm, respectively.

** Refer to Figure 2.3-2 for location of receptors.

The predicted maximum CO levels for the 1998 Existing 1-hour analysis ranged from 7.2 ppm to a maximum of 9.9 ppm (receptor 1) at the Route 44 and Longmeadow Road intersection. These values are well below the 1-hour CO NAAQS of 35 ppm. Maximum CO values for the corresponding 8-hour analysis were predicted to be at 6.5 ppm or lower, also well below the 8-hour CO NAAQS of 9 ppm.

The results of the 2010 No-Build and Build alternatives indicate that reductions in CO levels (averaging 10 to 20 percent) are expected compared to the 1998 Existing conditions. These results can be attributed to lower vehicle emissions due to newer (i.e., cleaner and more efficient) motor vehicles with improved motor vehicle emissions control technologies, fleet vehicle turnover, and Massachusetts emission control programs. Table 4.6-3 presents the maximum CO levels for the 2010 No-Build 1-hour and 8-hour conditions, which are predicted to be 7.3 ppm and 4.8 ppm, respectively. These levels are also below the CO NAAQS.

The results of the 2010 Build alternative are also predicted to be below the NAAQS. Table 4.6-3 presents the maximum CO concentrations at the Route 44 and Longmeadow Road intersection, which are predicted to be 7.4 ppm or lower for the 1-hour condition and 4.9 ppm or lower for the 8-hour condition. The station-related traffic increases are expected to result in only minor (0.1 ppm or lower) increases in CO levels compared to the No-Build conditions.

4.6.2.4 Other Commuter Rail Stations and Layover Facilities

Microscale analyses for the East Taunton, Freetown, Fall River, and New Bedford stations and the Fall River and New Bedford Layover facilities were described in the 1995 ENF. Additional traffic generated by these new stations would not result in any exceedences of the NAAQS at any location. The proposed layover facilities, although sources of localized emissions, will also be in compliance with the State Implementation Plan (SIP).

4.6.3 Commuter Rail Operations (Mesoscale Analysis)

An air quality analysis was conducted to evaluate the proposed New Bedford/Fall River Commuter Rail project's impact on regional emissions. The proposed New Bedford/Fall River Commuter Rail Extension is expected to provide service to motorists who ordinarily travel to and from Boston by motor vehicle. This shift in travel mode is expected to reduce overall vehicle emissions, although increased train service is expected to increase train emissions. Consequently, an evaluation of air quality impacts associated with the proposed MBTA New Bedford/Fall Commuter Rail project has been conducted to evaluate the regional impacts. This mesoscale analysis was conducted for the existing and future year conditions, for the Stoughton Alternative, to demonstrate that the project complies with the CAAA and Massachusetts SIP criteria. A similar analysis was done for the Attleboro Alternative and was included in the ENF.

4.6.3.1 Impacts

The mesoscale analysis evaluated the change in daily (24-hour period) NOx and VOC emissions due to the proposed commuter rail service. The total pollutant burden for vehicles and trains affected by the proposed project were calculated for the study area under Existing (1998) and future (2010) No-Build and Build conditions. The air quality analysis identified the relative impacts of reduced commuter traffic and increased train trips. The Stoughton Alternative will result in the elimination of over 1600 vehicle trips to downtown Boston from the North Easton, Raynham, and Dean Street, Taunton stations and over 7000 total trips combined from all of the stations. Table 4.6-4 presents the estimated pollutant-burden for the 1998 Existing, 2010 No-Build, and 2010 Build Conditions.

Table 4.6-4
Mesoscale Analysis Results*

Pollutant	1998 Existing Conditions (Vehicles)	2010 No-Build Conditions (Vehicles)	2010 Build Conditions (Trains)	Air Quality Benefits	Air Quality Impacts
Volatile Organic Compounds	308	136	37	99 kg/day reduction	
Carbon Monoxide	5,034	1,881	104	1,777 kg/day reduction	
Nitrogen Oxides	503	284	1,122		838 kg/day increase

* Expressed in kilograms per day

The 1998 Existing Condition estimates represents the emissions related to those vehicles that currently travel between Boston and communities near each of the future station sites, and will divert to transit once service becomes available. The VOC emissions from the 1998 Existing Condition were estimated to be 308 kilograms per day (kg/day) and were calculated as a baseline for comparing future-year emissions. Under the 2010 No-Build Condition, VOC emissions related to commuter travel to/from Boston for the number of commuters estimated to be diverted to rail were estimated to be 136 kg/day. The 2010 No-Build VOC emissions are lower than the 1998 emissions due to the implementation of emission control programs such as the Federal Motor Vehicle Emission Control Program, the Stage II Vapor Recovery program, and the Massachusetts Inspection and Maintenance program. The

2010 VOC emissions from the trains are estimated to be 37 kg/day, or 99 kg/day lower than the automobile emissions in the 2010 No-Build Condition. The commuter rail service would therefore decrease VOC emissions by 99 kg/day.

Similar emission trends for CO are expected, but at a larger magnitude. Under 1998 Existing conditions, CO emissions are predicted to be 5,034 kg/day and are expected to drop significantly to 1,881 kg/day under the 2010 No-Build conditions. Trains are anticipated to generate CO emissions of 104 kg/day, which will result in a total reduction of 1,777 kg/day compared to the No-Build alternative.

Predicted NOx emissions for the 1998 Existing and 2010 No-Build conditions are predicted to be 503 kg/day and 284 kg/day, following a downward trend similar to CO and VOCs. However, NOx emissions related to locomotive line-haul and idling activity are expected to be greater than the corresponding reductions from commuter-related vehicle emissions. The NOx emissions from trains are estimated to be 1,122 kg/day, which represents a net increase of 838 kg/day compared to the No-Build conditions.

It is important to note that future-year train emission estimates are based on emission rates that represent current locomotive engine technology. It is expected that over time that newer locomotives with lower emission rates and greater fuel efficiencies will be on-line. Therefore, the reported increase in NOx emissions may be overstated and the emission reductions of VOCs and CO may be greater.

4.6.4 Comparison with the Attleboro Alternative

The air quality study also demonstrated that the Stoughton Alternative will result in additional air quality benefits as compare to the Attleboro Alternative. The mesoscale analysis results demonstrate that the Stoughton Alternative is expected to reduce regional VOC emissions by an additional 26 kg/day and CO emissions by an additional 1,055 kg/day. In addition, the NOx increases calculated in the ENF for the Attleboro Alternative of 1,408 kg/day will be 838 kg/day for the Stoughton Alternative, 570 kg/day less than the Attleboro Alternative. The results of the mesoscale analyses are presented in Table 4.6-5.

Table 4.6-5
Emission Benefits (reductions) and Impacts (increases)*

Pollutant	Stoughton Alternative	Attleboro Alternative
Volatile Organic Compounds	99 kg/day decrease	73 kg/day decrease
Carbon Monoxide	1,777 kg/day decrease	722 kg/day decrease
Nitrogen Oxides	838 kg/day increase	1,408 kg/day increase

* Calculated as the difference between future emissions of commuter automobiles and commuter rail emissions

4.6.5 Summary

The air quality study demonstrate that the proposed MBTA New Bedford/Fall River Commuter Rail Extension is in compliance with the Massachusetts SIP under both the Stoughton and Attleboro Alternatives because there are:

- No new violation of the NAAQS will be created,
- No increase in the frequency or severity of any existing violations will occur, and
- No delay in attainment of any NAAQS will result.

The microscale analysis demonstrated that no new violations of the CO NAAQS will be created and that no CO violations exist in the study area. The mesoscale analysis demonstrated the implementation of the proposed MBTA New Bedford/Fall River Commuter Rail project is expected to reduce VOC emissions by replacing motor vehicle trips to and from Boston with transit trips. Consequently, the project is consistent with the goals of the CAAA and is in conformity with the Massachusetts SIP. In fact, mass transit is one of the transportation control measures encouraged under the CAAA as a tool to achieve regional and statewide air quality goals.

4.7 Noise Impact Assessment

A noise analysis was conducted to evaluate the noise impacts of the proposed MBTA New Bedford/Fall River Commuter Rail project. This analysis specifically addresses the noise impacts associated with the Stoughton Alternative and it contrasts them with the Attleboro Alternative as presented in the ENF.

4.7.1 Introduction

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, work or recreation. Under extreme conditions sound can cause physical harm such as hearing loss or adverse mental health effects. How people perceive any given sound depends on several measurable physical characteristics of the sound. These factors are:

- Intensity: Sound intensity is often equated to loudness. The sound level magnitude (typically measured in decibels) is a measure of sound intensity. A 10 decibel increase in intensity is generally perceived as a doubling in loudness.

- Frequency Content: Most common sounds are comprised of acoustic energy distributed over a variety of frequencies. Acoustic frequencies, commonly referred to as tone or pitch, are typically measured in Hertz (Hz). Pure tones (such as those generated by a tuning fork) have all their energy concentrated in a narrow frequency range. High-frequency (above 2,000 Hz) sound is typically considered more annoying than low-frequency (below 500 Hz) sound and may also be perceived as louder.

- Temporal Pattern: The temporal nature of sound includes factors such as continuity, fluctuation, impulsiveness, and intermittence. Sound with increasing intensity over time is often perceived as louder than sound with decreasing intensity. Impulsive and intermittent sounds are usually perceived as louder than the actual sound level.

Individual human response to noise is subject to considerable variability. There are many factors, both emotional and physical, which contribute to the variation in human reaction to noise. These factors are summarized in Table 4.7-1. The existence of numerous emotional and physical variables prohibits defining an exact individual or community response for any given noise level. Community noise criteria are therefore based on statistical averages of human response to noise and applicable health criteria.

Table 4.7-1
Factors Involved in the Human Reaction to Noise

EMOTIONAL VARIABLES

Feelings about the Necessity or Possibility of Prevention of the Noise: If people feel that their needs and concerns are being ignored, they are more likely to feel hostile towards the noise.

Judgment of the Importance and Value of the Activity which is Producing the Noise: If the noise is produced by an activity which people feel is vital, they are not as bothered by it as they would be if the noise-producing activity was considered superfluous.

Activity at the Time an Individual Hears the Noise: A person's sleep, rest and relaxation have been found to be more easily disrupted by noise than communication and entertainment activities.

Attitudes about Environment: The existence of undesirable features in a person's environment will influence the way in which the person reacts to noise.

General Sensitivity to Noise: People vary in their ability to hear sound, peoples' response to noise is linked to their physiological predisposition to noise and their emotional experience of annoyance to certain sounds.

Belief about the Effect of Noise on Health: The extent to which people believe that the noise exposure will damage their health, affects their response to the noise.

Feeling of Fear Associated with the Noise: The extent to which people fear physical harm from the source of the noise, affects their attitude towards the noise.

PHYSICAL VARIABLES

Type of Neighborhood: The type of neighborhood is sometimes associated with one's expectations regarding the noise exposure there. Instances of annoyance, disturbance and complaints associated with a particular noise exposure will be greater in areas which are typically noted for their quiet and that have a less active nature.

Time of Day: Noise intrusions are typically considered more annoying in the early evening and at night than during the day.

Season: Noise is considered more disturbing during the summer than in winter, especially in climates where, during the summer, windows are likely to be open and recreational activities occur outside more frequently.

Predictability of the Noise: Research has revealed that individuals exposed to unpredictable noise have a lower noise tolerance than those exposed to predictable noise.

Control over the Noise Source: Someone who has no control over the noise source will be more annoyed than someone who is able to exercise some control.

Length of Time an Individual is Exposed to a Noise: There is little evidence supporting the argument that annoyance resulting from noise will decrease with continued exposures, and, under some circumstances, annoyance increases with longer exposures.

Source: Aviation Noise Effects, USDOT-FAA, March 1985.

- Sound levels are most often measured using decibels (dB). The decibel scale is logarithmic and compresses the audible acoustic pressure levels which can vary from 20 micropascals (μPa), the reference pressure and threshold of hearing (0 dB), to 20 million μPa, the threshold of pain (120 dB). Because sound levels are measured in dB, the addition of two sound levels is not linear. To add sound levels in dB, the dB levels must be converted into "energy" terms ($10^{dB/10}$), which are added and then converted back to dB (10 Log "energy"). Adding two equal sound levels creates a 3 dB increase in overall level. An example is 50 dB (100,000 in "energy") added to 50 dB equals 53 dB (200,000 in "energy"). If more than a 10 dB difference exists between sound levels, there is no significant additive effect. An example is 50 dB (100,000 in "energy") added to 60 dB (1,000,000 in "energy") equals 60.4 dB (1,100,000 in "energy"). Table 4.7-2 illustrates the range of acoustic pressures (μPa) and their relationship to the acoustic decibel scale, as well as typical indoor and outdoor sound levels.

The human ear does not hear sound energy linearly (on a one-to-one basis), hence humans do not perceive changes in sound level as equally loud. Research indicates the following general relationships exist between sound level and human perception:

- A 3 dB increase is a doubling of acoustic energy. Studies have shown that 3 dB is the threshold for people to perceive a change in sound level. The average person will not be able to distinguish a 3 dB difference in sound level in a laboratory condition.

- A 10 dB increase is a tenfold increase in acoustic energy but is perceived as a doubling in loudness to the average person. The average person will judge a 10 dB change in sound level to be twice or half as loud.

Table 4.7-2
Typical Indoor and Outdoor Sound Levels

Outdoor Sound Levels	Sound Pressure (μPa)		Sound Level (dBA)	Indoor Sound Levels
	3,324,555	-	110	Rock Band at 5 meters (M)
Jet Over-Flight at 300 m		-	105	
	2,000,000	-	100	Inside New York Subway Train
Gas Lawn Mower at 1 m		-	95	
	632,456	-	90	Food Blender at 1 m
Diesel Truck at 15 m		-	85	
Noisy Urban Area—Daytime	200,000	-	80	Garbage Disposal at 1 m
		-	75	Shouting at 1 m
Gas Lawn Mower at 30 m	63,246	-	70	Vacuum Cleaner at 3 m
Suburban Commercial Area		-	65	Normal Speech at 1 m
	20,000	-	60	
Quiet Urban Area—Daytime		-	55	Quiet Conversation at 1 m
	6,325	-	50	Dishwasher Next Room
Quiet Urban Area—Nighttime		-	45	
	2,000	-	40	Empty Theater or Library
Quiet Suburb—Nighttime		-	35	
	632	-	30	Quiet Bedroom at Night
Quiet Rural Area—Nighttime		-	25	Empty Concert Hall
Rustling Leaves	200	-	20	
		-	15	Broadcast and Recording Studios
	63	-	10	
		-	5	
Reference Pressure Level	20	-	0	Threshold of Hearing

μPAMicroPascals describe pressure. The pressure level is what sound level monitors measure.
dBAA-weighted decibels describe pressure logarithmically with respect to 20 μPa (the reference pressure level).
Source: Highway Noise Fundamentals, Federal Highway Administration, September 1980.

The human ear does not perceive sound levels from every frequency as equally loud. As part of the hearing process, the human ear will attenuate low and high-frequency sounds. To compensate for this phenomena in perception, the A-weighted decibel scale, referred to as dBA, is used to measure and evaluate environmental noise levels. The A-weighted scale adjusts sound pressure levels by frequency, reducing low and high-frequency sound, similar to the way people hear sound. All of the sound levels used to evaluate noise impacts associated with this project are in dBA.

The most commonly used indicators for community noise surveys are the energy-averaged equivalent sound level (Leq) and the day-night averaged sound level (Ldn). The noise analysis used Ldn and Leq sound levels to evaluate noise impacts.

The Leq is the steady-state sound level which in a given period of time (typically one hour) contains the same acoustic energy as the time-varying (fluctuating) sound level during that same period. The Leq averages the background sound levels with short-term transient sound levels. The background sound level does not include noise from transient events (such as aircraft over-flights) and typically fluctuates during the day, week, and year. The 1-hour average Leq is implied throughout this analysis when the term Leq is used.

The Ldn noise indicator is a 24-hour weighted average sound level. The Ldn is derived from hourly Leq values that are energy-averaged and includes a nighttime penalty. The 10 dBA nighttime (10:00PM to 7:00AM) penalty is added to nighttime Leq values to account for increased annoyance during these hours. The Ldn is therefore greater than the 24-hour Leq because the Ldn includes this nighttime penalty. Studies have shown that additional annoyance occurs during the nighttime since background sound levels are typically at their minimum and many people are noise sensitive while trying to sleep.

The Leq and the Ldn are the most frequently used metrics in environmental noise analyses. Extensive federal research has concluded that the Leq and Ldn are the best metrics for determining annoyance (impact) to the human environment. The Ldn is currently the predominant noise metric used by most federal agencies, including the Environmental Protection Agency, Federal Transit Administration, Federal Aviation Administration, Department of Housing and Urban Development, and Department of Defense. The Federal Highway Administration uses the peak-hour Leq, which is consistent for determining "worst-case" daytime noise impacts, which typically occur during the daytime near highways.

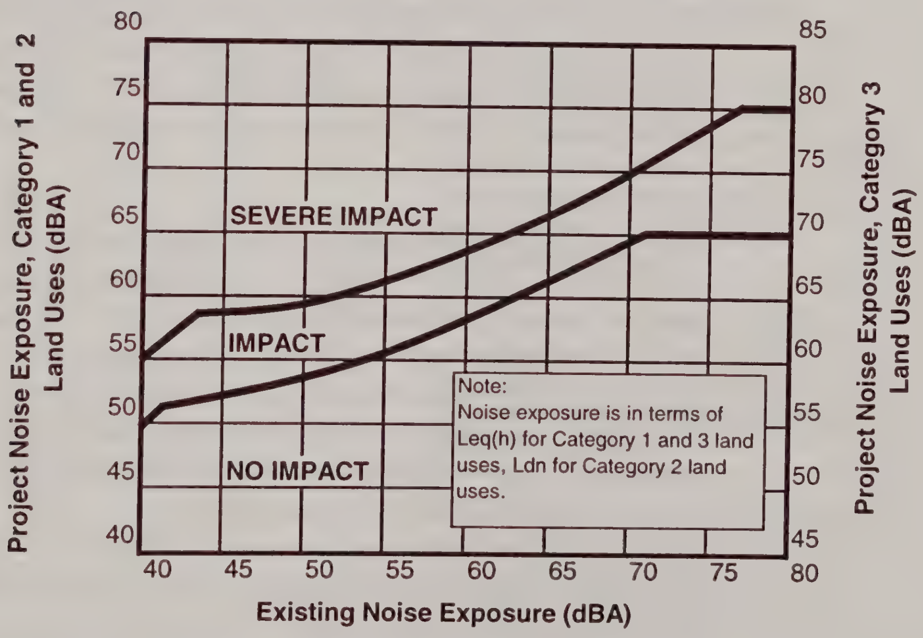
4.7.2 Noise Assessment Criteria

Train operations may increase sound levels at noise sensitive locations adjacent to the stations. The Federal Transit Administration (FTA) Transit Noise and Vibration

Impact Assessment guidelines[53] were used to predict if noise impacts would occur. These guidelines specify transit noise impact criteria and define procedures to predict transit noise exposure.

The FTA noise impact criteria were developed specifically for transit noise sources operating on fixed guideways or at fixed facilities. They are related to the existing sound levels, the future change in sound levels, and the land use category. These criteria are based on a curve relating the percentage of people highly annoyed, to the noise exposure in their residential environment. The residential criteria are based on the day-night average sound levels (Ldn), which includes a nighttime noise penalty that accounts for people's increased noise annoyance during the night. The non-residential criteria are based on the daytime, peak-hour equivalent sound level (Leq) for the noisiest hour of transit related activity during which human use occurs at the sensitive location. The daytime Leq is used for determining noise impacts at locations where nighttime noise sensitivity is not a factor. The noise impact criteria are presented in Figures 4.7-1 and 4.7-2.

Figure 4.7-1
Noise Impact Criteria for Transit Projects



Note:
Noise exposure is in terms of Leq(h) for Category 1 and 3 land uses, Ldn for Category 2 land uses.

Source: FTA's Transit Noise and Vibration Impact Assessment, April 1995

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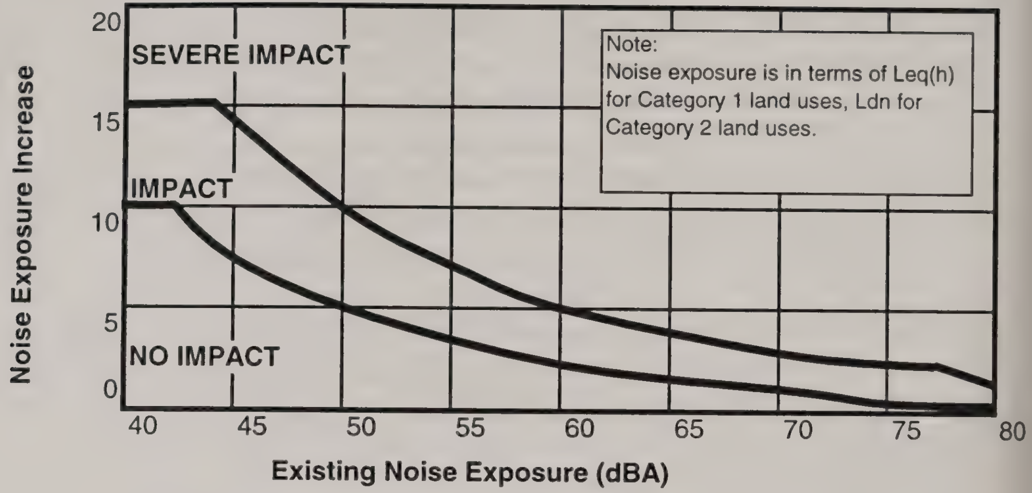
[53] *Transit Noise and Vibration Impact Assessment*, Federal Transit Administration, dated April 1995

Figure 4.7-2
Increases in Cumulative Noise Levels



The impact criteria are based on the relationship between existing noise exposure and project noise exposure. The criteria are divided into three categories (no impact, impact, and severe impact) based on the predicted project noise exposure level. Impact determinations are made by comparing the predicted project noise exposure with the existing sound level determined for each particular noise sensitive location. The relationship between impact assessment and the three impact categories is as follows:

No Impact: If the project noise exposure is less than the *No Impact* criteria, no commuter rail impacts are predicted. For existing noise exposures between 50 and 65 Ldn, the *No Impact* criteria reflects a noise exposure increase of 2 to 5 dBA.
Impact: If the project noise exposure is within the *Impact* criteria, moderate noise impacts are predicted. *Impact* rating (moderate noise impacts) means that commuter rail service is predicted to increase noise exposures at sensitive land uses adjacent to the track. For existing noise exposures between 50 and 65 Ldn, the *Impact* criteria reflects a noise exposure increase of 4 to 10 dBA.
Severe Impact: If the project noise exposure is within the *Severe Impact* criteria, severe noise impacts are predicted. The *Severe Impact* criteria means that commuter rail service is predicted to substantially increase noise exposures at sensitive land uses adjacent to the track. For existing noise exposures between 50 and 65 Ldn, the *Severe Impact* criteria reflects increased noise exposures in excess of 4 to 10 dBA.

As per the FTA guidelines and criteria, noise sensitive locations within impact distance to the rail corridor were categorized into three types of noise sensitive land uses. The three land use categories correlate land use with sensitivity to noise intrusions and reflect the various noise sensitive land uses which could be present along the proposed rail corridor. The three noise sensitive land use categories are defined in Table 4.7.3.

4.7.3 Methodology

Train operations may increase sound levels at noise sensitive locations adjacent to the rail corridor. The Federal Transit Administration (FTA) guidelines and procedures were used to predict if noise impacts would occur. These guidelines specify transit noise impact criteria and define procedures to predict transit noise exposure.

As per the FTA guidelines and criteria, noise sensitive locations within impact distance to the rail corridor were categorized into three types of noise sensitive land uses. The three land use categories correlate land use with sensitivity to noise intrusions and reflect the various noise sensitive land uses which could be present along the proposed rail corridor.

Table 4.7-3
Land Use Categories and Metrics for Transit Noise Impact Criteria

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor Leq(h)*	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Outdoor Ldn	Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor Leq(h)*	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios and concert halls fall into this category. Places for meditation or study associated with cemeteries, monuments, museums. Certain historical sites, parks and recreational facilities are also included.

* Leq for the noisiest hour of transit-related activity during hours of noise sensitivity.

The existing noise exposure at the noise sensitive land uses were determined according to the FTA procedures. The noise sensitive locations, which were previously categorized by land use, were also categorized by proximity to existing types of noise sources. These noise sources included the existing freight rail service, nearby roadways, and neighborhood specific sources such as commercial or industrial activity. Field monitoring was then initiated that confirmed the existing noise source characterizations and measured sound levels at 21 locations (Figure 2.3-2). Multiple measurements were made at each of the various types of existing noise sources to determine the existing sound level every noise sensitive location along the rail corridor. The existing noise source categories are described as follows.

- Locations close to major arterials such as Routes 44, 138, and 140 or other roadways which carried significant traffic, including heavy trucks, and would have significant daytime and nighttime traffic.

- Locations close to roadways that provided access to the major arterials and were used consistently throughout the day. These roadways have heavy truck traffic and both daytime and nighttime traffic. Specific roadways of this type include: Main Street (North Easton) and North Main Street (Raynham).

- Locations removed from major roadways. These roadways have isolated or infrequent traffic, and are unlikely to have a substantial volume of vehicles during the night. Specific roadways of this type include: Totham Farm Road (North Easton), Britton Street (Raynham), and Ingell Street (Taunton).

- Locations that warranted specific attention because peak-hour sound levels were required (Category 3 land uses) and those locations that were exposed to atypical noise sources. These locations include the 13 schools identified in the study area.

Noise generated by train operations depends on the type and number of locomotives and rail cars, the speed of the train, the type of rail and track structure, and the condition of rail and train wheels. The noise assessment is based on the following assumptions, which have a direct effect on the noise exposure resulting from the rail operations:

- Each train contains one diesel locomotive and eight coaches.

- The train is assumed to travel at 70 miles per hour, unless a station stop or track geometry, such as curves, bridge crossings or other safety considerations limit the speed. In these cases, a 30 mile per hour operating speed is assumed.

- The track is continuously welded (without joints that create impact noise) and is secured to concrete ties mounted on rock ballast.

- The train wheels are true (without flat spots) and the rail is smooth (without corrugations).

Wheel flat spots and rail corrugations can have a significant effect on increasing rail noise exposures. Therefore, to ensure that the project equipment (train wheels and track rails) does not deteriorate to the point where project noise levels are noticeably increased, the MBTA is committed to maintaining the track rails and train wheels to ensure that this does not occur.

The predominant noise sources associated with the train are the locomotive exhaust and cooling fans, the interaction of the steel wheels rolling on steel rails, and the locomotive warning horn which is sounded one-quarter mile prior to all public grade crossings. The loudest noise source is the locomotive warning horn, which produces a maximum sound level (Lmax) of 105 dBA at 50 feet. The locomotive produces a Lmax of 88 dBA at 50 feet, the loudest component being the diesel exhaust. The rail car produces a Lmax of 86 dBA at 50 feet, the loudest component being the steel wheel/rail interaction.

4.7.4 Noise Impacts

This section provides the results of the noise analysis related to commuter rail stations and commuter rail operations between Stoughton Station and Weir Junction in Taunton.

4.7.4.1 Commuter Rail Stations

This section examines noise impacts associated with each of the commuter rail stations proposed for the Stoughton Branch.

North Easton Station

The North Easton Station is located in a rural area adjacent to a motel. The nearest noise sensitive receptors are residences on Route 138 (Washington Street). The existing noise exposure in this neighborhood was determined to be 64 Ldn. Noise exposure was determined based on known noise exposures at similar areas. This noise exposure is typical for an urban residential area that is removed from heavily traveled roads. The predominant noise sources at this location are local traffic, activity at the school bus storage area, neighborhood activity, and nearby major roadways.

The commuter rail activity at the North Easton Station is not predicted to create an impact at the nearest sensitive receptors. The rail line is located over 1,000 feet from the nearest sensitive receptors and is predicted to have a project noise exposure of 47 Ldn at this location.

Traffic associated with the North Easton Station is not expected create impacts at the nearest sensitive receptors. The majority of the station's traffic is expected to occur during peak commuting hours, when area traffic is also greatest. Peak hour station traffic will not increase the overall traffic volume enough to create a noticeable change in sound level.

Raynham Station

The Raynham Station is near the Raynham-Taunton Greyhound Park. The nearest noise sensitive receptors are residences on Route 138 (Broadway). The existing noise exposure in these neighborhoods was determined to be 65 Ldn, based on noise exposures at similar areas. The predominant noise sources in these two neighborhoods are freight rail traffic, local traffic, and neighborhood activity.

The commuter rail activity at the Raynham Station is not predicted to create an impact at the nearest sensitive receptors. The rail line is located over 1,500 feet from the nearest sensitive receptors and is predicted to have a project noise exposure of 46 Ldn at this location.

Traffic associated with the Raynham Station is not expected create impacts at the nearest sensitive receptors. The majority of the station's traffic is expected to occur during peak commuting hours, when area traffic is also greatest. Peak hour station traffic will not increase the overall traffic volume enough to create a noticeable change in sound level.

Dean Street, Taunton

The Dean Street Station is located in an urban area adjacent to a manufacturing facility. The nearest noise sensitive receptors are the residences on Arlington Street. The existing noise exposure in these neighborhoods were determined to be 54 Ldn. These noise exposures are typical for urban residential areas that are near heavily traveled roads. The predominant noise sources at this location are local traffic, nearby commercial activity, freight rail traffic, and nearby major roadways.

The commuter rail activity at the Dean Street Station in Taunton is not predicted to create an impact at the nearest sensitive receptors. The rail line is located over 600 feet from the nearest sensitive receptors and is predicted to have a project noise exposure of 52 Ldn at this location.

Traffic associated with the Dean Street Station is not expected create impacts at the nearest sensitive receptors. The majority of the station's traffic is expected to occur during peak commuting hours, when area traffic is also greatest. Peak hour station traffic will not increase the overall traffic volume enough to create a noticeable change in sound level.

Freetown Station

The Freetown Station is located in an undeveloped area. The nearest noise sensitive receptors are the residences on High Street. The existing noise exposure in these neighborhoods were determined to be 57 Ldn. These noise exposures are typical for a rural residential area that is somewhat removed from heavily traveled roads. The predominant noise sources at this location are local traffic, nearby commercial activity, freight rail traffic, and nearby major roadways.

The commuter rail activity at the Freetown Station is not predicted to create an impact at the nearest sensitive receptors. The rail line is located more than 200 feet from the nearest sensitive receptors and is predicted to have a project noise exposure of 47 Ldn at this location.

Traffic associated with the Freetown Station is not expected create impacts at the nearest sensitive receptors. The majority of the station's traffic is expected to occur during peak commuting hours, when area traffic is also greatest. Peak hour station traffic will not increase the overall traffic volume enough to create a noticeable change in sound level.

4.7.4.2 Commuter Rail Operations

Noise sensitive locations along the proposed commuter rail corridor were identified from aerial photography and field survey. The majority of the noise sensitive locations within 1000 feet of the rail corridor are residences (Land Use Category 2). Thirteen schools (Land Use Category 3) were identified near the rail line. Only 2 schools are within 1000 feet of the corridor; the Summer Street School in Taunton and the Southeastern Regional Vocational High School in South Easton. Neither school location will experience noise impacts from this project. No Land Use Category 1 areas were identified within 1000 feet of the rail corridor.

As shown in Table 4.7-4, existing noise exposure at sensitive receptors along the proposed commuter rail corridor varies from 54 to 72 Ldn. The corridor passes through urban, suburban, and rural areas that have existing noise exposures that range from quiet to moderately noisy. These existing noise exposures are dominated by noise from nearby roadways. The existing noise exposures above 62 Ldn result from traffic volume adjacent to the rail corridor and from current freight activity on the rail corridor. Both occur at locations that are within 150 feet of the existing track.

Commuter rail operations are predicted to create noise impacts at noise sensitive land uses adjacent to the rail corridor. Noise impacts from operations result from the rail vehicle passbys and train warning horns, which are sounded one-quarter mile prior to all public grade crossings. Noise exposure impacts are categorized into moderate and severe impacts. Moderate impacts are those which exceed the no impact threshold but are less than the severe impact threshold, as defined in

Figures 4.7-1 and 4.7-2. The predicted project noise exposure at noise sensitive land uses adjacent to the rail corridor are presented in Table 4.7-6.

The project noise exposure at sensitive receptors along the proposed commuter rail corridor vary from 46 Ldn at locations greater than 1,600 feet, to 66 Ldn at locations less than 40 feet from the track. Severe impacts are predicted at locations where the project noise exposure exceeded 60 to 64 Ldn, based on the existing noise exposure. No impacts to Category 3 land uses are predicted since the Category 3 land uses identified are not close enough to the rail corridor.

Impact distances from the rail line were calculated for various existing noise levels to facilitate identifying affected sensitive noise receptors. These distances were calculated by determining the sound increase over existing levels that would indicate moderate and severe noise impacts. This calculated sound level required to trigger an impact was then converted to a distance from the track, in feet. Sensitive receptors found within the distances listed in Table 4.7-4 may experience the corresponding impact level. These noise impact distances are calculated based on FTA guidelines for evaluating transit noise impacts[54]

Table 4.7-4
Noise Impact Distances (Feet), by Existing Noise Level (dBA)

Existing Sound Level	Distance to Impact Level (Feet)		
	Severe	Moderate	No Impact
(dBA)	Closer than	Between	farther than
60	115	115-225	225
61	100	100-200	200
62	100	100-200	200
63	75	75-175	175
64	75	75-175	175
65	65	65-150	150
66	55	55-135	135
67	55	55-135	135
68	50	50-115	115
69	45	45-100	100
70	45	45-100	100
71	40	40-65	65
72	30	30-65	65

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[54] Federal Transit Administration, Transit Noise and Vibration Impact Assessment, Table 3-1: "Noise Levels Defining Impact for Transit Projects", DOT-T-95-16, April 1995.

Table 4.7-5
Project Noise Exposures at Noise Sensitive Locations*

Location	Map Number**	Land Use Category	Existing Noise Exposure*	Project Noise Exposure*	Number of Moderate Impacts	Number of Severe Impacts	Horn Noise
Stoughton							
Brock Street	1	2	65	66	8	3	Yes
Plain Street	1	2	62	61	14	8	Yes
Morton Street	2	2 & 3	72	59	0	0	Yes
				Totals	**22**	**11**	
Easton							
Elm Street	6	2	70	61	10	0	Yes
Oliver Street	6	2	63	59	2	0	Yes
Pond Street	6	2	63	59	8	0	No
Main Street	6	2	66	61	15	6	No
Bridge Street	7	2	61	61	15	2	No
Short Street	8	2	67	64	5	0	Yes
Depot Street/123	9	2	69	65	1	0	Yes
Purchase Street	9	2	64	56	2	0	Yes
Prospect Street	10	2	62	64	2	0	Yes
				Totals	**60**	**8**	
Raynham							
Elm Street (MP 15.40)	16	2	61	64	3	4	Yes
Carver Street	17	2	62	65	1	1	Yes
Route 138	18	2	70	65	4	0	Yes
Britton Street	18	2	60	65	4	4	Yes
King Phillip Street	19	2	66	64	3	4	Yes
				Totals	**15**	**13**	
Taunton							
Longmeadow Street	21	2	69	52	2	0	Yes
Dean Street	22	2	68	61	2	0	Yes
Ingell Street		2	66	59	0	0	Yes
Hart Street		2	68	61	6	0	Yes
				Totals	**10**	**0**	
				Totals	**107**	**32**	

* Noise exposures are presented in Ldn except where noted.

** Refer to Figure 2.3-2

The sensitive receptor locations along the Stoughton Branch were evaluated and based on their existing sound levels and the noise impact distances noise impacts were identified. The noise analysis identified 107 moderate noise impacts adjacent to the rail corridor. Moderate noise impacts result from locomotive and rail car noise and from train warning horns, which are sounded one-quarter mile prior to all public grade crossings. Moderate noise impacts reflect the fact that the commuter rail service is predicted to increase noise exposures at sensitive land uses adjacent to the track. Most moderate impacts result from Ldn noise exposure increases of less than 4 dBA. Moderate noise impacts may not warrant mitigation, in accordance with FTA criteria.

The noise analysis identified 26 severe noise impacts adjacent to the rail corridor for the Stoughton Branch. Severe noise impacts typically result from the close proximity to locomotive and rail car noise and from locomotive warning horns, which must be sounded one-quarter mile prior all public grade crossings. Severe noise impacts result from Ldn noise exposure increases of 2 to 6 dBA. All "Severe" noise impacts warrant mitigation.

4.7.5 Construction Noise Impacts

This section discusses potential construction noise associated with the major elements of construction along the Stoughton Branch.

4.7.5.1 Track Improvements

Track improvements may create noise impacts as a result of track and bridge reconstruction activities. Construction activities will increase sound levels in adjacent areas, however, these increases will be temporary and short lived. The particular types of construction equipment or activities are not defined at this stage of the design. Therefore, construction impacts can not be quantitatively assessed at this time.

Since rail replacement activities, which includes grading, ballast, and rail laying, will continuously move along the corridor, noise from these activities will only occur for several weeks at any one location. Bridge and grade crossing reconstruction activities will occur for a slightly longer duration, since these activities require more time. None of the noise impacts associated with track improvements will be permanent.

4.7.5.2 Station Construction

Station construction activities may increase noise exposures in adjacent areas during some phases of the construction. However, these increases will be temporary. Since particular construction equipment and activities are not defined at this stage of design, construction impacts can not be quantitatively assessed at this time.

Every reasonable attempt will be made to minimize construction noise impacts. Construction noise control is accomplished by the use of quiet equipment and procedures. Noise guidelines will be incorporated into construction documents and will conform with local, state, and federal statues. Specific noise control measures will be reviewed during detailed engineering design and will be negotiated as part of the construction permitting process. Noise specifications will be enforced through a program of field inspection and compliance review.

4.7.6 Mitigation

The MBTA is committed to providing noise mitigation for all noise sensitive locations predicted to experience severe noise impacts. Once track and station designs are finalized, the MBTA will develop a Noise Mitigation Implementation Plan (NMIP). As part of the commitment to provide noise and vibration mitigation, the MBTA has a standing policy to commit up to two percent of the project construction budget on noise mitigation. If this sum proves insufficient to complete the NMIP, additional funds will be requested so that the entire NMIP can be implemented. Based on the final project design, the NMIP will identify noise sensitive areas that will experience severe noise impacts from the project and will develop a mitigation implementation schedule.

4.7.6.1 Commuter Rail Operations

The impact analysis was based on conservative assumptions about train operating conditions and did not include a detailed evaluation of topographic conditions between the rail corridor and the impacted receptors. Therefore, prior to the specification of noise impact mitigation a site specific evaluation will be made for all noise sensitive locations that are predicted to experience severe impacts. All of the sensitive noise receptors that are predicted to have severe noise impacts under the refined analysis will warrant consideration for noise mitigation. Two types of noise mitigation measures are being considered for rail noise abatement, noise barriers or building soundproofing.

Noise barriers along the edge of the rail corridor right-of-way are capable of reducing wayside noise by as much as 10 dBA. A 10 dBA reduction in project noise level would reduce the project noise exposure below the threshold for determining severe impact at all of the predicted severe impact locations. Noise barriers are usually cost effective only when designed to shield a large number of residences spaced close together. A noise barrier must be constructed high enough to break the line of sight from the receiver to the noise sources of the train, the major one being the diesel exhaust on top of the locomotive, approximately 15 feet above the top-of-rail. Noise barriers must also be continuous and long enough to screen out a moving train along most of its visible path, nearby large openings for road access will significantly reduce a barrier's effectiveness.

Under circumstances when a noise barrier is either not feasible because of engineering or economic issues, building sound proofing will be considered. Building sound proofing can provide noise reductions of up to 5 to 20 dBA, depending on the tightness of the original building and the quality of the existing windows.

4.7.6.2 Unavoidable Noise Impacts

After detailed mitigation designs (noise barriers or soundproofing) have been finalized, residual noise impacts may still be present. Noise barriers can provide a maximum of approximately 10 dBA noise reduction, and usually protect only the ground level floors. Soundproofing can provide 10 to 15 dBA of additional exterior-to-interior noise reduction, but does not mitigate exterior noise and the building's windows must remain closed to maintain effectiveness.

4.7.6.3 Construction Mitigation

Every reasonable attempt will be made to minimize construction noise impacts. Construction noise control is accomplished by the use of quiet equipment and procedures. Noise guidelines will be incorporated into the construction documents and shall be in conformance with local, state, and federal statues. Specific noise control measures will be reviewed during detailed engineering design and are negotiated as part of the construction permitting process. Noise specifications will be enforced through a program of field inspection and compliance review.

Most of the track and bridge reconstruction will occur during the normal workday. Under special circumstances, where road or rail traffic interruptions have to be minimized, night work may occur. During these conditions, unusually noisy activities will be scheduled during daytime hours to minimize noise impacts to residential areas during periods of rest and sleep.

The station construction work will occur during the normal workday. Under special circumstances, when night work may occur, unusually noisy activities will be scheduled during daytime hours to minimize noise impacts to residential areas during periods of rest and sleep.

4.7.7 Comparison with the Attleboro Alternative

The noise analysis demonstrated that the Stoughton Alternative will result in fewer moderate and severe impacts as compared to the Attleboro Alternative. The Attleboro Alternative noise analysis presented in the ENF identified 294 sensitive receptors that would experience moderate noise impacts and 143 sensitive receptors that would experience severe impacts between the Shore Line and Weir Junction in Taunton. In comparison, the Stoughton Alternative noise analysis identified 107 sensitive receptors that would experience moderate noise impacts and 32 sensitive receptors that would experience severe impacts between Brock Street in Stoughton and Ingell Street in Taunton. The section of track south of Ingell Street in Taunton, where the Stoughton Alternative joins the same track location as the Attleboro Alternative to New Bedford and Fall River, is expected to result in 293 moderate impacts and 115 severe impacts. These noise impacts will be the same under both the Stoughton and Attleboro Alternatives. Over the entire rail corridor, the Stoughton Alignment is expected to result in two-thirds as many moderate impacts and just over half as many severe noise impacts as the Attleboro Alternative.

The total noise impacts by each alternative are presented in Table 4.7-6.

Table 4.7-6
Number of Receptor Locations Impacted

	Stoughton Alternative		Attleboro Alternative	
Location	**Moderate**	**Severe**	**Moderate**	**Severe**
Ingell Street - North	107	32	294	143
Ingell Street – South to New Bedford & Fall River	293	115	293	115
Total Noise Impacts	400	147	587	258

4.7.8 Vibration

A vibration analysis was conducted to evaluate the vibration impacts of the proposed MBTA New Bedford/Fall River Commuter Rail project. This analysis specifically addresses the vibration impacts associated with the Stoughton Alternative and it contrasts them with the Attleboro Alternative as presented in the ENF.

Vibration levels associated with the Stoughton Alternative were evaluated using the FTA project-level vibration criteria. These criteria are based on single-event passby levels, receptor sensitivity, and frequency of occurrence. The procedures used in this analysis were conducted in accordance with the FTA guidelines and procedures[55].

The preferred vibration descriptor is the root-mean-square (RMS) vibration velocity level, which has been shown to best simulate and correlate to the human body's sensitivity to vibration. The RMS vibration velocity level is expressed in units of decibels referenced to one microinch per second (or VdB).

This vibration analysis used modeling assumptions and methodologies that were applied along the Attleboro to Fall River/New Bedford alignment to maintain continuity with the previous study. This included the types of trains proposed, rail and trackbed type, and vibration source levels. The common modeling methodology consisted of the following steps:

- The Stoughton Branch was separated into five discrete segments so that operational parameters, such as train speed, could be better defined. This segmentation also reflects city and town boundaries as well.
- Previous measurements of existing train passbys along the Northeast Corridor were used to develop an empirically based mathematical vibration model. This model relates the ground and soil conditions with the commuter rail train speeds to predict future vibration levels at nearby receptors.
- Using the FTA vibration criteria limits for the onset of impact, vibration impact distances from each set of operational parameters were then computed for each of the respective segments of the Stoughton Branch. Impact distances, or the distance within which a vibration impact is expected to occur, were applied in the form of vibration contour lines drawn onto aerial photographs to determine the number and location of impacted receptors.
- Finally, the vibration analysis identified and tabulated sensitive receptors within the impact distances along the Stoughton Branch. These receptor locations were sorted by type (residential or institutional) and by location (city and town).

Although generalized ground surface vibration curves are included in the FTA guidelines, vibration measurements were taken as part of the previous Attleboro to Fall River/New Bedford study. These measurements were used to provide site-specific vibration curves that were used to assess the vibration levels from MBTA commuter rail train passbys along the Stoughton Branch.

Vibration measurements were conducted in August 1995 at two receptor locations in Attleboro and Mansfield, Massachusetts. Measurements were also conducted along the Northeast Corridor at various distances from the track centerline and for various train speeds. The train tracks on the Northeast Corridor were constructed in a similar

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[55] *Transit Noise and Vibration Impact Assessment*, Federal Transit Administration, dated April 1995

manner as the tracks proposed along the Stoughton Extension. These measurements were used to develop an empirical relationship between commuter rail train speed, distance to the receptor, and the expected vibration level. These empirical equations relate the ground and soil conditions with the expected vibration level along that part of the rail corridor. For modeling purposes, it was assumed that the ground and soil conditions along the Stoughton Branch are similar in nature to those along the Northeast Corridor alignment.

The following describes the criteria used to evaluate the vibration levels along the proposed Stoughton Branch Alternative.

FTA Annoyance Criteria

The FTA vibration criteria are related to ground-born vibration levels that are expected to result in human annoyance, and are based on RMS vibration velocity expressed in VdB relative to one micro-inch per second. The FTA's experience with community response to ground-borne vibration indicates that when there are only a few train events per day that it takes higher vibration levels to evoke the same community response that would be expected from more frequent events. This is accounted for in the FTA criteria by distinguishing between projects with frequent and infrequent events. Frequent events is defined as more than 70 events per day. The vibration criteria levels shown in Table 4.7-9 are defined in terms of human annoyance for different land use categories, such as high sensitivity (Category 1), residential (Category 2), and institutional (Category 3). In general, the threshold of human perceptibility of vibration is 65 VdB.

FTA Damage Criteria

It is extremely rare for vibration from train operations to cause building damage, including minor cosmetic damage. Damage from vibration is unlikely to occur except when the track alignment is very close to the structure. The criteria levels for minor structural damage (possible cracks in plaster walls) is 100 VdB for fragile buildings and 95 VdB for fragile historic buildings.

Table 4.7-7
FTA Ground-Borne Vibration Impact Criteria*
(RMS Vibration Velocity Level in VdB re: 1 μ-ips)

Category	Description	Ground-Borne Vibration Levels
Annoyance & Interference		
Category 1	Buildings where low vibration is essential for interior operations	65 VdB
Category 2	Residences and buildings where people normally sleep	80 VdB
Category 3	Daytime institutional and Office use	83 VdB
Damage		
All	Fragile Buildings	100 VdB
All	Fragile Historical Buildings	95 VdB

* Infrequent Events is defined as fewer than 70 vibration events per day.

4.7.8.1 Existing Conditions

There is presently no rail activity along the Stoughton Branch south of MBTA commuter rail station in Stoughton Center. Existing vibration levels at sensitive receptors along the Stoughton Branch are attributed to motor vehicle passbys on local roadways or non-rail related construction activities. Measurements previously taken indicate that typical vibration levels from motor vehicles range from 44 to 71 VdB at a distance of approximately 50 feet.

4.7.8.2 Affected Environment

The project design will use continuously welded rail along the Stoughton Branch. Continuously welded rail track produces less vibration relative to other track configurations, such as jointed rail. The impact distances are expected to range from 54 feet for commuter rail trains traveling at 40 mph, to 77 feet for trains traveling at the maximum allowable speed of 70 mph. Exceedances of the FTA criterion of 80 VdB for 'infrequent' events would only occur at residences directly adjacent to the rail track and within these distances.

There are no known vibration-sensitive Category 1 receptors, such as facilities using vibration-sensitive photographic or manufacturing processes, located along the proposed Stoughton Branch that would be adversely affected. Approximately 56 residences (Category 2) are expected to experience a vibration impact due to commuter rail operations. Under Category 3, only one receptor (a preschool in Easton Center at Main and Williams Streets) is predicted to be adversely affected by commuter rail operations. The results of the vibration analysis are presented in Table 4.7-8.

Table 4.7-8
Vibration Impacts

Segment	City/Town	Milepost From:	Milepost To:	Category 2 Residential	Category 3 Institutional
1	Stoughton	4.3	6.4	14	0
2	Easton	6.4	13.6	26	1
3	Raynham	13.6	18.4	10	0
4	Taunton	18.4	19.2	0	0
5	Taunton	19.2	20.4	6	0
Totals				56	1

The total number of affected residences and businesses for the Stoughton Alternative includes those receptors documented in Table 4.7-8, along the Stoughton Branch, and the affected receptors between Weir Junction and the terminal stations in Fall River and New Bedford as documented in the ENF. The Stoughton Alternative would affect 175 receptors south of Weir Junction, for a total of 232 vibration impacts. By contrast, the Attleboro Alternative would affect a total of 245 receptors.

4.7.8.3 Mitigation

The MBTA is committed to providing vibration mitigation for all vibration sensitive locations predicted to experience vibration impacts. Once track and station designs are finalized, the MBTA will develop a Noise Mitigation Implementation Plan (NMIP). As part of the commitment to provide noise and vibration mitigation, the MBTA has a standing policy to commit up to two percent of the project construction budget on noise mitigation. If this sum proves insufficient to complete the NMIP, additional funds will be requested so that the entire NMIP can be implemented. Based on the final project design, the NMIP will identify vibration sensitive areas that will experience vibration impacts from the project and will develop a mitigation implementation schedule.

The vibration impacts occur primarily along densely populated areas where receptor locations are near the proposed rail corridor. The NMIP will review the train passby speeds along these vibration sensitive areas. Where train speed reductions are not viable, the use of vibration isolating and absorbing devices, such as ballast mats, may be used to substantially reduce vibration levels.

4.8 Historic and Archaeological Resources

The presence of known historical and archaeological resources within much of the project area were presented in the ENF filed with the Secretary in September 1995. The ENF identified known cultural resources within the existing railroad rights-of-way comprising the Attleboro Alternative. The ENF presented data on the Northeast Corridor, the Attleboro Bypass, the Attleboro Secondary, the New Bedford Main Line and Fall River Secondary rail corridors and the station locations proposed at that time.

This Draft EIR considers the Stoughton Alternative and examines the potential impacts to resources within or adjacent to the Stoughton Branch right-of-way. Since the filing of the ENF in 1995, additional background research and preliminary field assessments were conducted to identify known or potential historical and archaeological resources that may be impacted by the Attleboro Bypass. These data are also presented.

This Section of the Draft EIR describes the existing cultural resources within 250 feet of the proposed centerline of the Stoughton track, the Easton, Raynham, and Dean Street stations, the relocated Battleship Cove and relocated Freetown commuter rail stations and presents recommendations for additional field investigation and coordination with the Massachusetts Historic Commission.

4.8.1 Existing Conditions

This section describes existing cultural (historic and archaeological) resources along the Stoughton Branch and station sites. As described in Chapter 2, the Stoughton Alternative would extend existing commuter rail service from South Station to Weir Junction in Taunton along the disused Stoughton Branch and continue along the active New Bedford Main Line and Fall River Secondary which currently serve freight traffic.

4.8.1.1 Stoughton Branch

Massachusetts Historical Commission Records were researched and preliminary field survey was conducted to identify all known historical and archaeological resources. The project area was defined as follows:

- Historical: all potential resources within 250 feet of the track centerline,

- Archaeological: all potential sites within one-half mile of the track centerline

Background research conducted at the MHC and preliminary field investigations conducted by the Public Archaeological Laboratory identified 53 listed, or potentially eligible, historic properties and five archaeological sites within the study area. These resources include six existing bridges constructed between 1900 and 1930 crossing the right-of-way that are potentially eligible for listing on the State or National Historic Registers of Historic Places. The bridges are deck stringer and pony girder structures common to the period and are not likely to determined eligible for listing based on previous determinations by State Historic Preservation Officers in the region.

The Stoughton Branch crosses three historic districts:

- North Easton Historic District, Easton
- H.H. Richardson Historic District, Easton
- Church Green Historic District, Taunton

The North Easton Historic District encompasses the area roughly bounded by Washington Street (Route 138), Main Street, Elm Street and Canton Street. The H.H. Richardson Historic District is contained within the North Easton Historic District and includes portions of Main and Elm Streets.

The Stoughton Branch passes through the western portion of the North Easton Historic District and center of the H.H. Richardson Historic District and includes the historic structures 12 through 15 in Table 4.8-1. These structures include two pony girder and deck stringer bridges that are not likely to be eligible for listing on the State or National Registers, the North Easton Old Colony Railroad Station on Oliver Street and the Oaks Ames Memorial Hall.

The railroad station, located at 80 Mechanic Street and directly adjacent to the right-of-way, was personally commissioned in 1882 by F.L. Ames, then the director of the Old Colony Railroad, and designed by H.H. Richardson. The station was complete and the grounds landscaped by F.L. Olmstead in 1884. The railroad station served as a passenger facility until service on the Stoughton Line ceased in 1958. The building currently houses the Easton Historical Society.

The Ames Oaks Memorial Hall is located adjacent to 53 Main Street, greater than 500 feet from the Stoughton Branch, and is included in the survey because it falls within the North Easton Historic District and H.H. Richardson Historic Districts. This building dates to 1880 and was also designed by H.H. Richardson and landscaped by F.L. Olmstead.

The Church Green Historic District located in Taunton includes portions of Arlington Street, Dean Street, Summer Street, and Prospect Street and contains 27 potentially eligible structures.

Historic resources and potential archaeological sites within the study area are shown on Figure 2.3-2 and listed in Tables 4.8-1 and 4.8-2. Several of these structures have been previously evaluated and determined not eligible for listing on the State or National Registers.

4.8.1.2 Route 138 Grade Crossing

MHC records identified no previously recorded historic or archaeological resources in the vicinity of the proposed Route 138 grade separation in Raynham. The area (Britton Street) does contain approximately 10 late 19th and early 20th century residential structures. The MBTA will consult with MHC to determine is additional survey is necessary. The area is of low archaeological sensitivity due to previous construction impacts associated with the existing roadway.

4.8.1.3 North Easton Station

MHC records do not identify any known historic or archaeological resources in the vicinity of the proposed North Easton Commuter Rail station. The station site includes former farmland and an abandoned gravel pit where the top soil has been completely removed. The site is characterized as a moderately to severely disturbed landscape and is of low archaeological sensitivity resulting from past land use.

4.8.1.4 Raynham Station

There are no known historic or archaeological resources in the vicinity of the proposed Raynham Commuter Rail station. The area is immediately adjacent to the existing Raynham Taunton Greyhound Park and contains a variety of storage and stockpile areas and paved parking lots. The disturbances associated with commercial and industrial use of the land extends to the edges of the Hockomock Swamp. The area is of low archaeological sensitivity resulting from the construction of the Greyhound Park facility and subsequent industrial use of the surrounding area.

4.8.1.5 Taunton Station (Dean Street)

There are no known historic or archaeological resources in the vicinity of the proposed Dean Street Commuter Rail Station. The site currently houses a one-story utility building constructed circa 1950 and is in the vicinity of a dilapidated mill complex. The site is north of the Old Colony Railroad Station, listed on the National Register of Historic Places and a contributing structure of the Church Green Local Historic District. The area is of low archaeological sensitivity, having been extensively impacted by construction of the railroad and buildings in the vicinity.

4.8.1.6 Freetown Station (relocated station)

This site contains an inactive gravel pit and has been extensively altered. The site does not contain any historic structures or known archaeological sites. Past land disturbance at the site indicates low archaeological sensitivity.

4.8.1.7 Battleship Cove Station

This station site is currently developed and does not contain any historical structures or known archaeological sites. The site has low archaeological sensitivity resulting from previous land disturbance.

4.8.1.8 Attleboro Bypass

There are no known historic or archaeological sites within the proposed Attleboro Bypass corridor. The majority of the corridor is undisturbed land crossed. The proposed bypass crosses an electric utility corridor and several roads. With these exceptions the bypass has moderate archaeological sensitivity. The locations where the alignment crosses roads and wetlands have low archaeological sensitivity because of past land disturbance from construction activities.

4.8.1.9 Other Historic Resources

Historic and archaeological resources were investigated for the Attleboro Secondary, New Bedford Main Line, Fall River Secondary, and the East Taunton, Fall River, and New Bedford commuter rail stations. These investigations were documented in the 1995 ENF.

This investigation determined that several historic structures, and the Assonet Historic District in Freetown, occur within 250 feet of the rail alignment. The closest structures include the Wamsutta Mills complex in New Bedford and the Sagamore Mills in Fall River. Analysis of potential vibration impacts documented that there were no potential impacts to these structures, and that the replacement of existing rail with new continuous welded rail would decrease vibration. No archaeological or historic resources were identified at any of the proposed station sites.

Table 4.8-1
Historic Resources

SR	State Register	MRA	Multiple Resource Area
NR	National Register of Historic Places	CG	Church Green
NHL	National Historic Landmark	LHD	Local Historic District

Map #	Milepost	Property	MHC Reference #	SR/NR Status
Stoughton				
1	3.70-4.0	Stoughton Square Area (Pleasant, Seaver, Washington, Wyman, and Porter streets)	Area A	not evaluated
2	3.90	Stoughton Town Hall 10 Pearl Street	12 Area A	Eligible (MHC 1988)
3	3.95	Stoughton Railroad Station 53 Wyman Street	44 Area A	NR 1974
4	4.01	Lucius Clapp Memorial (Stoughton Public Library) 6 Park Street	11 Area A	NR 1992
5	4.22	Coal Yard Road Bridge (deck stringer, ca.1900-1930)	--	Recommended not eligible
6	5.90	Totman Farm Road Bridge (bridge superstructure removed)	--	Recommended not eligible
7	5.90	Benjamin Marshall House 1823 Washington Street	72 Area E	not evaluated
Easton				
8	6.60	Day's Farm Road Bridge (deck stringer, ca.1900-1930)	--	Recommended not eligible
9	6.80	"Cowessett" (Whitman) Brook Bridge (deck stringer, ca.1900-1930)	--	Recommended not eligible
10	7.20-8.10	North Easton Historic District	Area E	NR 1972

Map #	Milepost	Property	MHC Reference #	SR/NR Status
		(Lincoln, Main, Elm and Canton streets Route 138).		
11	7.60-8.05	H.H. Richardson Historic District of North Easton (Main & Elm streets)	Area F	NR 1987 NHL 1987
12	7.85	North Easton Railroad Station Oliver Street	8 Area E, F	NR 1972 NHL 1987
13	7.90	Ames/Pond Street Bridge (pony girder, ca.1900-1930)	--	Recommended not eligible
14	7.95	"Small Creek" (Queset Brook) Bridge (deck stringer, ca.1900-1930)	--	Recommended not eligible
15	8.05	Oakes Ames Memorial Hall Main Street	1 Area E, F	NR 1972 NHL 1987
16	11.80	Poule House 269 Foundry Street	63	not evaluated

Raynham

There are no historic properties surveyed or listed in the State or National Registers in the project area in Raynham.

Taunton

Map #	Milepost	Property	MHC Reference #	SR/NR Status
17	19.30-20.0	Church Green Local Historic District (Church Green, Dean St., Longmeadow Rd., Summer St.)	Area AC	CG LHD 1979
18	19.50-19.60	Church Green Historic District Routes 44 and 140	Area AC	NR 1977
19	19.30	William Woodward House 117 Arlington Street	44 Area AC	NR MRA 1984 CG LHD 1979
20	19.30	119 Arlington Street	43 Area AC	CG LHD 1979
21	19.30	Hartshorn Estate Barn 131 Arlington Street	42 Area AC	CG LHD 1979

Map #	Milepost	Property	MHC Reference #	SR/NR Status
22	19.30	Old Colony Railroad Station 40 Dean Street	45 Area AC	NR MRA1984 CG LHD 1979
23	19.40	Townsend House 11 Dean Street	38 Area AC	CG LHD 1979
24	19.40	Franklin B. Williams House 24 Dean Street	39 Area AC	CG LHD 1979
25	19.40	Theodore Dean House 26 Dean Street	40 Area AC	NR MRA 1984 CG LHD 1979
26	19.40	Charles R. Atwood House 30 Dean Street	41 Area AC	NR MRA 1984 CG LHD 1979
27	19.40	William and Chester Reed House 44 Dean Street	46 Area AC	CG LHD 1979
28	19.40	Irving Colby-Melton Ferris House 50 Dean Street	47 Area AC	CG LHD 1979
29	19.40	Thorpe-Witherell House 56 Dean Street	49 Area AC	CG LHD 1979
30	19.85	Thomas L. Church House 58 Summer Street	78 Area AC	CG LHD 1979
31	19.85	Catholic Middle School 61 Summer Street	64 Area AC	CG LHD 1979
32	19.85	Benjamin Vickery House 62 Summer Street	77 Area AC	CG LHD 1979
33	19.85	J.W.D. Hall House 65 Summer Street	65 Area AC	CG LHD 1979
34	19.85	Summer Street School 66 Summer Street	76 Area AC	CG LHD 1979
35	19.85	Anson J. Barker House	66	CG LHD 1979

Map #	Milepost	Property	MHC Reference #	SR/NR Status
		67 Summer Street	Area AC	
36	19.85	Lewis E. Field House 73 Summer Street	67 Area AC	CG LHD 1979
37	19.85	Alta L. Deane House 77 Summer Street	68 Area AC	CG LHD 1979
38	19.85	J.M. Godfrey House 78 Summer Street	74 Area AC	CG LHD 1979
39	19.85	C.H. Carver Shop 80 Summer Street	73 Area AC	CG LHD 1979
40	19.85	86-88 Summer Street	72 Area AC	CG LHD 1979
41	19.85	Samuel Blake House 90 Summer Street	71 Area AC	CG LHD 1979
42	19.85	Neck of Land School 91 Summer Street	70 Area AC	CG LHD 1979
43	19.85	Neck of Land Cemetery Summer Street	879 Area AC	NR MRA 1984 CG LHD 1979
44	19.90	Walter Smith House 1 Prospect Street	75 Area AC	CG LHD 1979
45	19.90	Residence 9 Prospect Street	210	not evaluated
46	19.90	H.G. Reed House 15 Prospect Street	211	not evaluated
47	19.90	Rev. Thomas Clapp House 35 Prospect Street	212	not evaluated
48	19.90	Henry A. Dickerman House 63 Prospect Street	37 Area AC	CG LHD 1979

Map #	Milepost	Property	MHC Reference #	SR/NR Status
49	20.00	Mill River Bridge (deck girder, ca. 1900-1930)	--	Recommended not eligible
50	20.10	A.G. Williams House 215 High Street	227	not evaluated
51	20.10	G.L. Walker House 218 High Street	228	not evaluated
52	20.10	Enos D. Williams House 220 High Street	229	not evaluated
53	20.10	Residence 241 High Street	230	not evaluated

Table 4.8-2
Known Prehistoric Archaeological Sites

Site #	Milepost	Town	MHC Reference #	Comments
1	00.30	Stoughton	19-BR-68	location data only
2	15.40	Raynham	19-BR-243	Edwards Site
3	15.50	Raynham	19-BR 230	Costa Farm Late Archaic - Woodland
4	18.10 - 18.20	Raynham	19-BR-52	"10 acre Woodland village" Trow collection
5	19.50	Taunton	19-BR-62	burial site reported in 1930

4.8.2 Impacts and Mitigation

The ENF described the potential impacts associated with the Attleboro Alternative and use of existing railroad lines for a commuter rail extension to Fall River and New Bedford. This section focuses on the potential impacts to cultural resources associated with the Stoughton Branch and provides additional information on potential impacts associated with the Attleboro Bypass gathered since the publication of the ENF in 1995.

4.8.2.1 Stoughton Branch

The Stoughton Branch is a disused railroad corridor that extends from Canton Junction in Stoughton to Cotley Junction in Taunton. The land within the right-of-way was disturbed or filled during the construction of the rail corridor in the mid-1880s resulting in a low archeological sensitivity.

MHC records indicate that there are 53 potentially historic structures within 250 feet of the rail corridor. Twenty-seven of these structures are located within the Church Green Historic District in Taunton and four are within the North Easton and H.H. Richardson Historic District in North Easton.

The project will not require the removal of any historic structure and no direct impacts are anticipated. Indirect impacts to historic structures that may result from the project are limited to vibration due to passing trains along the corridor. Section 4.7.8 of this Draft EIR presents an analysis of vibration impacts potentially associated with the Stoughton Alternative.

The magnitude of vibration caused by passing trains increases with train speed. Vibration decreases with increasing distance at a rate determined by soil composition and ground cover. Potential impacts due to vibration are divided into two categories: annoyance and destructive. The distance at which vibrations are occur (annoyance) is 54 feet for the majority of the Stoughton Branch. From Stoughton Junction to Raynham Station, vibrations will occur up to 77 feet from the track. The minimum distance at which destructive vibrations occur is, by definition smaller than annoyance vibrations.

The only historic structure within the annoyance zone is the North Easton Old Colony Railroad Station. However, as discussed below this structure was designed as a passenger rail station and safely operated for 80 years. Accordingly, there will be no impacts to historic structures as a result of vibration from passing trains. However, the MBTA is committed to identifying and mitigating any potential vibration impacts.

This close proximity to an active rail line would normally elicit some legitimate concerns regarding impacts from vibration. However, this building was designed and constructed as a passenger rail terminal and served as such for 75 years. The existing Stoughton Commuter Rail Station (MHC Ref. 44) is a similar structure, constructed at the same period, and is also directly adjacent to the commuter rail tracks. While no impacts to this structure are anticipated from the use of the Stoughton Branch, the MBTA will work with the Massachusetts Historic Commission and the Town of Easton Historic Commission to monitor the existing structure to avoid any impacts, and will commit to the installation of vibration mitigation measures, as described in Section 4.7.10 of this Draft EIR, if warranted.

4.8.2.2 Proposed Stations

The station sites described in the ENF included Taunton Center, East Taunton (Dean Street), Freetown[56], Fall River, and New Bedford. The Stoughton Alternative includes new or relocated stations in North Easton, Raynham, Taunton (Dean Street), Freetown, and Fall River. None of these station sites contain any known historic or archaeological resources. Each station site has been previously developed or altered and is of low archaeological sensitivity.

4.8.2.3 Attleboro Bypass

All of the land within the Attleboro Bypass is undeveloped land. No structures or known archaeological sites are present within the required right-of-way and no impacts would be anticipated. Archaeological sensitivity within the proposed Attletboro Bypass includes low, moderate and high sensitivity.

4.8.3 MHC Coordination

The reconnaissance study conducted by the MBTA will be submitted to the MHC for their review and concurrence. The MBTA will continue to coordinate with the MHC to identify any additional data collection, investigations, or mitigation measures to protect historic resources of the Commonwealth.

4.8.4 Summary

The Stoughton Alternative will not result in impacts to any known historic structure or archaeological site. No structures are proposed for demolition as part of the Stoughton Alternative. The only potentially eligible historic structure close enough to potentially experience vibration impacts is the North Easton Old Colony Railroad Station. While this structure abuts the alignment, no impacts are anticipated due to its design and former operation as a passenger station.

Track improvements and upgrading of existing signal systems is proposed within active rail corridors. This work will not impact any known historic structure or archaeological site.

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[56] The Freetown station described in the DEIR is at a different location that the station site presented in the ENF.

4.9 Hazardous Materials

This section discusses the potential presence of oil or hazardous materials (OHM) on or adjacent to the proposed Stoughton Branch. Particular attention is given to the three proposed station sites (North Easton, Raynham, and Dean Street) and the Route 138 grade-separated crossing. The potential for encountering OHM along the Attleboro Bypass segment of the Attleboro Alternative is also discussed. To assess the potential for encountering OHM, the MBTA performed a Preliminary Environmental Site Assessment (PESA) for the Stoughton Alignment and the Attleboro Bypass in June 1998. The PESA included tasks to identify the following:

- previous and current uses of the site and adjoining properties;
- information regarding historic releases of OHM; and
- indications of potential site contamination that could affect the development of either alignment.

The PESA, discussed below, consisted of:

- reviewing readily available information at state and local offices;
- reviewing underground storage tank documentation at local fire stations;
- reviewing available Sanborn Fire Insurance Maps for the proposed alignment and station sites;
- reviewing aerial photographs of the three station sites and the proposed grade separated crossing of Route 138;
- performing a computer database search of nine federal and state environmental databases using New England Datamap Corporation's First Search®; and
- conducting a limited site walkover inspection.

Hazardous materials along the Attleboro Alternative, including the New Bedford Main Line, Fall River Secondary, East Taunton Station, Fall River Station, New Bedford Station, and layover facilities were documented in the ENF.

4.9.1 Stoughton Branch

This section discusses the Stoughton Branch, including its three proposed station sites, the Route 138 grade-separated crossing, and the remainder of the right-of-way.

4.9.1.1 North Easton Station

The North Easton Station site is proposed to be built approximately 1,000 feet west of Route 138 on the Easton/Stoughton town line. The proposed station site is approximately 20 acres and is undeveloped. The site is bounded by the railroad right-of-way to the west, undeveloped land to the north, the Route 138 Motel to the east, and undeveloped land to the south (See Figure 2.3-2).

According to records at the Easton Town Clerk's Office, a fuel oil underground storage tank (UST) has been located at the Route 138 Motel (approximately 1,000 feet east of the proposed station site) since 1963. No other data on the site were available at municipal offices. During the limited site walkover, ammunition shells and miscellaneous scrap metal with bullet holes were observed scattered throughout the site. No overt evidence of a UST (*e.g.*, fill or vent pipes) was observed on the proposed station site.

Based on the findings of the PESA, the MBTA will perform the following tasks prior to construction:

- perform additional research regarding the condition of the UST at the Route 138 Motel;
- perform PESAs for the specific parcels along the access road from Route 138.; and
- because of evidence of fire arms use at the site, test surficial soils for metals.

4.9.1.2 Raynham Station

The proposed Raynham Station site is proposed to be built approximately 500 feet west and northwest of the Raynham-Taunton Greyhound Park. The site is bounded by the railroad right-of-way to the west, undeveloped land to the north, the Raynham-Taunton Greyhound Park to the east, and undeveloped land to the south (see Figure 2.3-2). The proposed station site is currently used by the Carney Brothers Construction Corporation as a heavy equipment and vehicle storage area, out-dated equipment storage area, and a utility pole storage and treatment area. The site is cleared and covered with reclaimed asphalt.

Aerial photographs from 1984 of the site were reviewed as a part of this PESA. The photographs depict the site as being cleared, unpaved, and storing utility poles, similar to current uses. During the limited site walkover inspection, some staining from the utility pole treatment chemicals was observed on portions of the site.

The long term storage of treated utility poles, trucks, and heavy equipment for salvage represents a potential for the release of oil and hazardous materials to the environment. The MBTA will perform a general surficial and subsurface investigation to assess the presence of wood treatment chemicals, metals and petroleum products in soil and groundwater at the site if the property is acquired by the MBTA.

4.9.1.3 Dean Street Station

The Dean Street Station is proposed to be built north of the intersection of Railroad Avenue and Arlington Street in Taunton. For the purposes of the PESA, the station site was assumed to include the properties between Railroad Avenue and the existing railroad right of way (ROW), from the junction of Railroad Avenue with Arlington Street north, as well as the property west of Railroad Avenue and north of Arlington Street (see Figure 2.3-2). The area west of Railroad Avenue consists of the former New Jersey Rubber Company property. Land uses surrounding the proposed station site include commercial, industrial, residential and recreational development, and undeveloped land.

The eastern portion of the proposed Dean Street Station site is currently occupied by the Crown Tank Works, Inc. (manufacturers of steel tanks) and the western portion of the proposed station site is currently occupied by the abandoned New Jersey Rubber Company complex (former manufacturers of rubber heels, soles, and tubing). Current uses of properties adjacent to the proposed Dean Street Station site include: undeveloped land and residences to the north; railroad right-of-way with an active track, baseball fields, undeveloped land and a pond to the east; residences, a building materials warehouse (which appears to occupy the former railroad station), the Taunton Girl's Club, and Dean Street to the south; and residences, and Belmont and Arlington Streets to the west.

An environmental database search was performed as part of the PESA for the Dean Street Station. The site was identified five times on the database search. The Crown Tank Works property was identified on the state hazardous waste and the underground storage tank databases. The former New Jersey Rubber Company complex was identified on the CERCLA, state hazardous spills, and the ERNs databases. Three nearby properties were also identified in the database search including a RCRA generator approximately 500 feet to the southwest, a UST approximately 800 feet to the southeast, and an ERNs/spill site approximately 1,000 feet to the southwest.

A Final Preliminary Assessment Report for the Cabin Realty Trust site (former New Jersey Rubber Company complex), prepared by Roy F. Weston, Inc. was also reviewed. as part of the PESA. According to the report, groundwater samples from the property in 1987 contained volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), metals, and asbestos above method detection limits. In addition, there is an area of PCB contaminated soils on the site.

During the limited site walkover inspection of the property on June 3, 1998, miscellaneous solid wastes, including 55-gallon drums, compressors, transformers, steel tanks, automobile tires, 5-gallon buckets, and scrap metal, were observed on the property.

The PESA of the proposed Dean Street Station site and its adjoining properties identified:

- current and former industrial uses which likely involved oil and hazardous materials (OHM),
- former USTs and the potential that USTs remain at some locations on the site;

- Documented releases of OHM at the former New Jersey Rubber Co. facility; and
- The presence of miscellaneous wastes, foundations of former structures, and partially collapsed buildings at the site.

These finding indicate potentially significant environmental concerns. Therefore, prior to acquiring the property, the MBTA will perform a full ASTM Phase I Environmental Assessment for the Crown Tank Works facility and the former New Jersey Rubber Company complex.

It is likely that the environmental concerns identified thus far will be confirmed by the Phase I ESA. If that is the case, the MBTA will undertake a comprehensive surficial and subsurface investigation. In addition, the MBTA will perform a comprehensive survey of all structures for the presence of asbestos-containing materials (ACM) and lead-based paint (LBP).

4.9.1.4 Route 138 Grade-Separated Crossing

The Stoughton Alignment includes a proposed grade separation at Route 138 in Raynham. Properties that abut the north quadrant of the crossing include the Central Oil Corporation and a Massachusetts Electric Company transformer, an unused rail spur, and undeveloped woodland abutting the west quadrant. Properties that abut the east quadrant of the crossing include the Raynham U.S. Post Office, a retail building and undeveloped land, and commercial properties abutting the south quadrant. Figure 2.3-2 shows the locations of locations of properties in the vicinity of the proposed grade-separated crossing.

There are ten aboveground storage tanks (ASTs) on the Central Oil Corporation property (one 20,000-gallon #2 fuel oil, one 20,000-gallon regular leaded gasoline, one 15,000-gallon #2 fuel oil, one 15,000-gallon regular unleaded gasoline, one 10,000-gallon diesel fuel, one 7,000-gallon premium unleaded gasoline, and four 330-gallon kerosene tanks).

The area of the proposed Route 138 grade-separated crossing was not identified on the database search. The Central Oil Corporation was identified, however, as a state hazardous waste and hazardous spills site.

The PESA of the proposed grade separated crossing of the Stoughton Branch right-of-way and Route 138 in Raynham identified:

- current and former commercial uses of abutting properties;
- at Central Oil Corp., in the north quadrant of the crossing and directly abutting the ROW, ten ASTs and associated distribution piping and facilities for fuel oil, kerosene, and gasoline;
- documented, historic release of petroleum products at the Central Oil Corp. facility; and

- an electrical substation with indicators of PCB-containing transformers in the west quadrant of the crossing and directly abutting the ROW.

These finding indicate potentially significant environmental concerns and more general requirements for environmental assessment. Therefore, the MBTA will perform the following tasks:

- perform full ASTM Phase I Environmental Assessments (ESAs) of the Central Oil Corp., the electrical substation, and the numerous commercial properties which abut the proposed grade separated crossing;

- if environmental concerns are confirmed or identified by the Phase I ESAs, the MBTA will undertake appropriate subsurface investigations; and

- perform a comprehensive survey for presence of asbestos-containing materials (ACM) and lead-based paint (LBP) for any structures that would be demolished for construction of the proposed crossing.

4.9.1.5 Stoughton Branch

As part of the PESA for the Stoughton Branch, the MBTA performed the following activities for the remaining portions of the alignment:

- an environmental database search with a one-quarter mile radius on the entire length of the alignment;
- further research at the DEP on properties identified on the database search;
- a limited site reconnaissance on accessible sections of the alignment focusing on portions where the adjoining land has been developed;
- review of readily available information at the municipal offices; and
- viewing of the alignment at all grade crossings for overt evidence of OHM.

Table 4.9-1
Potential Hazardous Waste Sites Along the Stoughton Branch (not including Station Sites or the Route 138 Crossing)

Site Number*	Site	Environmental Concern	Recommendations
1	Cohen Property	Designated Superfund Site	Assess potential soil contamination in ROW prior to construction
2	General Cable Corporation	Soil and groundwater contamination State hazardous waste spill site: UST location	Research status of remediation and UST. Assess soil contamination within ROW
3	Dial Fabrics	State hazardous waste spill site	No investigation needed
4	McClellan Fuel Company	Above ground fuel oil storage tanks	No investigation needed
5	Rose's Used Auto Parts	Used and salvage autos	No investigation needed
6	Former Olsen Oil Company	State hazardous waste spill site	No investigation needed
7	Trucchi's Supermarket Warehouse	State hazardous waste site, UST location, ERNS site. Cleanup undertaken	No investigation neede
8	DeAngelis Iron Works	Petroleum contamination	Assess potential soil contamination in ROW prior to construction
9	North Easton Historical Industrial Area	State hazardous spill site. USTs (removed). Unknown material used for undergrade bridge fill at Main Street and Bridge Street	Assess potential soil contamination in ROW prior to construction
10	Cyn Environmental Services	RCRA corrective action, state hazardous waste spill site, UST location	Assess potential soil contamination in ROW prior to construction

* The site number refers to the numbered triangles on Figure 2.3-2

4.9.2 Attleboro Bypass

A PESA was also performed for the Attleboro Bypass similar in scope to that done for the Stoughton Alignment. The PESA identified just one area of environmental concern, a multi-tenant commercial automotive property at 1076 Pleasant Street in Attleboro near the proposed Pleasant Street grade-separated crossing. This property has USTs and was identified as a RCRA generator in the database search. The MBTA will perform a complete Phase I Environmental Site Assessment for this property if it is impacted by construction and perform further subsurface investigations if the site assessment indicates the need.

4.9.3 Other Locations

PESA investigations were conducted for the Attleboro Secondary, New Bedford Main Line, Fall River Secondary, and the East Taunton, Fall River, and New Bedford station sites and layover facilities, and were documented in the ENF. These investigations identified 9 confirmed or suspected contaminant sites adjacent to the railroad right-of-way, and recommended additional investigations prior to construction in order to develop an appropriate soils management program to protect the public health and welfare.

4.9.3.1 New Bedford Station

Subsequent investigation at the New Bedford commuter rail station and layover facility site, portions of which identified by the EPA as a CERCLIS site, were undertaken to determine actions required by the MBTA prior to commuter rail station construction.

Since the time of the PESA, the Site regulatory status has changed significantly. As noted in the PESA, the Site was listed as both a Location To Be Investigated (LTBI) under the Massachusetts Contingency Plan (MCP) and a federal CERCLIS site based on detection in 1985 of elevated concentrations of PCBs, metals and PAHs in soils by a USEPA contractor. Based on documents available, there was no action on the Site under CERCLIS from 1985 to 1997. [CERCLIS is the U.S. EPA's Comprehensive Environmental Response, Compensation, and Liability Information System; it tracks and prioritizes sites where uncontrolled disposal of hazardous wastes has been reported. CERCLIS listed sites may become eligible for response actions (assessment and cleanup) under the federal Superfund program or may remain on the CERCLIS list for years.]

However, based on the initial data, Site contaminants were eventually considered serious enough to warrant further action by EPA. In February, 1997, contractors for EPA performed sampling and field testing of surficial soils at 96 locations in the northwestern portion of the Site. Based on elevated levels of PCBs and polycyclic aromatic hydrocarbons (PAHs) detected, a Superfund Removal Action was initiated in May, 1997. According to the EPA On-Scene Coordinator (OSC) for the project, this remedial action was performed under the Superfund Removal Program, which is a limited program targeted at surface soil issues posing imminent dangers to public health. Superfund Removal Actions are generally limited in scope, cost and time frame. The selected remedial actions were fencing of the northern half of the Site and commencement of a detailed round of surficial soil sampling and analysis across the entire Site. The fence was completed in June, 1997, while the detailed sampling progressed.

The results of the Site-wide sampling and analysis program indicated that PCBs, arsenic and lead are the primary contaminants of concern at the Site. The highest concentrations of contaminants were detected in the already-fenced, northern area, designated Area A by EPA. Arsenic and PCBs levels in the southern half of the Site (designated Area B) were lower, but still of concern. The results were provided to the Agency for Toxic Substances and Disease Registry (ATSDR) of the US Department of Health and Human Services, for evaluation of health issues associated with exposures to Site contaminants. In February, 1998 ATSDR issued its Health Consultation for the Site, now officially termed the "Railroad Depot Site, New Bedford, MA". Potential risks to human health were identified and the ATSDR recommended restricting access to all of the Site. According to the EPA OSC, the fencing of the Site concludes EPA's Superfund Removal Action and EPA involvement. The Site will now revert to state, local and private control. According to the EPA OSC, Conrail (CSX) is considered a viable Potentially Responsible Party.

The next MCP step for the Site would be preparation and filing of a Tier Classification Submittal in accordance with the MCP. Most likely, the available analytical data could be used to produce this submittal. Given the Site conditions, it is likely that the Site would be classified as a Tier IA site, thus requiring substantial DEP involvement. DEP involvement would be for review and approval, however, not for performance of response actions. After Tier Classification, the next steps for the Site under the MCP process would include a comprehensive site investigation, including risk assessment, and development and selection of a remedial alternative (Phase III). Following those phases of work, the remedial design and cleanup phases could proceed.

4.9.3.2 Fall River Station

Conditions at the proposed Fall River Commuter Rail Station were investigated and reported in the ENF. This site, formerly occupied by a foundry and the Old Colony Fall River Depot, contains several industrial buildings. The site presents environmental concerns due to the former foundry operations, metal fabricating and painting operations, and the presence of drums, debris, and transformers. Further investigation to determine the nature and extent of oil and hazardous materials and the presence of asbestos-containing material or lead-based paint is required prior to construction.

4.9.3 Summary

Preliminary environmental site assessments (PESAs) were conducted for the Stoughton Branch, including its three proposed station sites, and for the vicinity of the Route 138 grade-separated crossing. A PESA was also conducted for the Attleboro Bypass portion of the Attleboro Alternative to supplement the information provided in the Environmental Notification Form. The PESAs were conducted to identify potential OHM releases that could affect construction or cost of the alternatives.

The PESA found the following:

- the North Easton Station site appears to have no environmental concerns related to OHM;
- the Raynham Station site requires further surficial and subsurface investigation to test for contamination caused by the long-term storage of treated utility poles at the site;
- the Dean Street Station also has the potential for OHM contamination and will require a full ASTM Phase I Environmental Assessment and possibly surficial and subsurface testing;
- the vicinity of the Route 138 grade-separated crossing will also require a full ASTM Phase I Environmental Assessment for the Central Oil Corporation property, the nearby electrical substation, and several other commercial properties;
- buildings that are to be demolished for the Route 138 grade-separated crossing will need to be tested for the presence of lead and asbestos;
- ten additional locations (other than the station sites) were identified along the proposed Stoughton Alignment that had potential for OHM; of these, five require additional testing of soils within the right-of-way; and
- the Attleboro Bypass segment of the Attleboro Alternative does not appear to have any environmental concerns related to OHM.
- Additional investigations under the MCP would be required prior to construction of the New Bedford commuter rail station and layover facility.

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Wetland Variance Request

This chapter of the Draft Environmental Impact Report presents a draft Wetlands Variance Request for the New Bedford/Fall River Commuter Rail extension project, that documents the need for a variance from the Wetlands Protection Act regulations and the project's compliance with the three fundamental criteria for issuance of a variance.

5.1 Need for a Variance

The New Bedford/Fall River Commuter Rail project will result in the loss of more than 5,000 square feet of bordering vegetated wetlands, and does not meet the criteria provided in 310 CMR 10.53 for a "limited project" which may be permitted even if certain performance standards are not met. Therefore, in accordance with 310 CMR 10.58, there must be a request to the DEP for a Variance from WPA regulations. This section of the regulations, 310 CMR 10.58, allows the Commissioner of DEP to waive the regulations in Part III of 310 CMR 10.00 when there is a finding that:

- There are no reasonable conditions or alternatives that would allow the project to proceed in compliance with the regulations;
- Mitigation measures are proposed that will allow the project to contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act; and
- The Variance is necessary to accommodate an overriding public interest.

The following sections discuss each of these criteria.

5.2 Overriding Public Interest

The extension of commuter rail service to the southeastern Massachusetts cities of Fall River and New Bedford is necessary to accommodate several important public interests within southeastern Massachusetts and Boston, which include:

- Reduction of traffic congestion
- Improved employment and tourist access

- Improved regional air quality
- Improved regional transportation capacity

The New Bedford/Fall River Commuter Rail project will provide rail service in the communities of Easton, Raynham, Taunton, Freetown, Fall River, and New Bedford, and will allow commuters from the towns of Swansea, Westport, Dartmouth, Fairhaven, Mattapoisett, Acushnet, and Lakeville and others to access commuter rail via stations in adjacent communities. Existing highway and transit facilities do not meet the existing or future needs for access to Boston or between study area communities.

5.2.1 Reduction of Traffic Congestion

Access from the study area communities to Boston is primarily via Routes 24 and 140 to I-93. These principal, limited-access highways currently operate at or over capacity, with peak-hour volumes of up to 2,640 vehicles per hour and level of service (LOS) of F on Route 24 in Raynham, and 3438 vehicles per hour and LOS F on I-93 in Braintree. Routes 24 and I-93 currently operate over their capacity levels. Although several mitigation measures have been implemented on I-93 to reduce congestion (high-occupancy vehicle lanes, improved MBTA Red Line service, Old Colony Rail service), this roadway continues to operate at unacceptable levels of service, resulting in substantial congestion and decreased safety.

Congestion on these primary roads also affects travel time. During peak hours (6 to 10 AM and 3 to 7 PM), trip times increase by 15 to 20 minutes. This results in loss of productivity, increased transportation costs, and affects the quality of life of commuters. The New Bedford/Fall River Commuter Rail service (Stoughton Alternative) would provide an approximately 50-mile trip with a travel time of 1 hour 20 minutes to South Station.

The New Bedford/Fall River Commuter Rail service (Stoughton Alternative) is projected to reduce vehicles using Route 24 and I-93 by more than 4,000 vehicles per day during both the inbound (AM) and outbound (PM) commute. This will contribute to the reduction of traffic congestion on these key routes.

5.2.2 Improved Employment Access and Economic Benefits

The City of Boston continues to provide substantial employment opportunities at all levels, and also contains a substantial employment labor force. Access between study area communities and downtown Boston is constrained by the limited, overtaxed highway system and lack of alternative transit modes. Parking in Boston is also severely constrained by the limited space available for new parking, high demand for parking spaces that has resulted from new residential development, and the high cost of parking. These factors also present a very serious constraint on further automobiles commuting into Boston.

Many of the study area communities, particularly in the northern towns of Easton, Raynham and Taunton, have a substantial work orientation to Boston. Residents of these communities would benefit substantially from improved employment access and reduced cost of commuting and parking.

New Bedford and Fall River currently have higher unemployment rates than the state average. The New Bedford metropolitan area has been one of the slower growing regions in employment, and in May, 1999 had an unemployment rate of 5.2 percent, while Fall River (measured as the Providence-Fall River-Warwick area) had an unemployment rate of 3.4 percent. Both were higher than the state average of 2.9 percent[1]. Improved access to employment markets in Boston would be likely to provide employment opportunities for the New Bedford and Fall River labor force that would provide substantial economic benefits for these communities. Commuter rail service would also allow "reverse commutes" from area communities such as Taunton to New Bedford and Fall River. New employers in New Bedford, such as the Compass Bank headquarters, would be able to draw on a larger labor pool within the southeastern Massachusetts region.

The introduction of commuter rail into previously unserved areas typically has a significant positive impact on residential property values. Increased property values would benefit New Bedford, Fall River, and other study area communities by increasing tax revenues and promoting urban revitalization.

5.2.3 Improved Regional Air Quality

The study area is located within an area designated nonattainment for ozone by the US Environmental Protection Agency (EPA), with a classification of "serious". Motor vehicles are the predominant sources of ozone precursor emissions within the study area. A shift in travel mode from automobiles to rail is expected to result in an overall reduction in vehicle emissions of volatile organic compounds and carbon monoxide, and would improve regional air quality.

5.2.4 Improved Regional Transportation Capacity

Areas east of this study area are served by the Middleborough Branch of the Old Colony Line, with stations in Lakeville and Bridgewater, while communities to the west are served by the Shore Line. The major population centers of the communities in this study area are as much as 25 miles from existing commuter rail stations, with access over local secondary roads. Parking lots at existing stations are regularly filled to capacity on weekdays prior to 7 AM. The increased commuter distance and uncertainty of parking availability results in few study-area commuters being able to access transit services. There are no light rail or other transportation options within the study area.

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[1] RKG Associates, 1997. Task 2 Research Findings: Existing Conditions Analysis, New Bedford Harbor Today. Prepared for the New Bedford and Fairhaven Harbor Master Plan Committee.

Private express bus service provides commuter service to South Station in Boston during commuter hours and contribute to the area's transit options, but are subject to severe congestion on the highway system and require transit riders to transfer to the MBTA light rail system to access most employment destinations in Boston, increasing travel time. For these reasons, bus service provides an acceptable transportation mode to relatively few commuters. The New Bedford/Fall River Commuter Rail service would provide direct transit connections to the Back Bay Station as well as South Station, eliminating the need for commuters to make intermodal transfers and reducing commuting time and cost.

Poor or limited transportation opportunities also constrain access by study area residents to other important Boston destinations, which include education opportunities, with numerous private and public colleges and universities, the highest concentration of medical facilities and specialties in the Commonwealth, cultural facilities, and sports. Existing highway congestion, extended travel times, and the limited and expensive parking affect the ability of area residents to access these other destinations. The University of Massachusetts at Dartmouth has recently established a new campus for the visual and performing arts in the New Bedford Harbor area. Improved transportation connections to this campus center would also benefit students.

The New Bedford –Fairhaven Harbor Master Plan[2] provides a comprehensive plan for redevelopment and revitalization of the harbor area, which has recently been designated as the New Bedford Whaling National Historic Park. Attractions, which include DEM's Schooner *Ernestina*, the proposed New Bedford aquarium, festivals, tours, and a new waterfront visitor destination at the State Pier, are estimated to attract an additional 120,000 visitors a year and generate $4 Million in gross revenues. The annual waterfront Summerfest currently attracts 100,000 people[3]. Improved transportation access via commuter rail would increase attendance at the Harbor's proposed tourism attractions, while alleviating some of the parking requirements for these attractions[4].

The Master Plan supports the development of a major intermodal transportation center providing commuter rail, freight, bus, and waterfront trolley connections with links to the water terminal for ferry and water taxi services. This intermodal terminal would be located in the North Terminal/Mills Area, some of the most underutilized land and water resources in the hrbor, and adjacent to a proposed multimodal port terminal on approximately 30 acres of land to be created by the harbor cleanup dredging.

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[2] New Bedford/Fairhaven Harbor Master Plan. Prepared by the City of New Bedford and Town of Fairhaven Harbor Master Plan Committee, 1999.

[3] FXM associates, New Bedford/Fairhaven Harbor Master Plan. Technical Memorandum: Expanded Economic Analysis. 1999.

[4] RKG Associates, 1997. Task 2 Research Findings: Existing Conditions Analysis. New Bedford Harbor Today.

5.3 Alternatives Considered

The 1997 *Expanded Alternatives Analysis* evaluated 4 primary alternatives. Each of these alternatives included variations with respect to service, operations, and equipment. These alternatives are listed below and described in detail in the following section.

- Attleboro Alternatives
  - Standard Train Consists, Alternating Service
  - Diesel Multiple Unit Service
- Middleborough Alternatives
  - Standard Consists, Alternating Service
  - Skip-Stop Service/Cross-Platform Transfer at East Taunton
  - Relocated Middleborough/Lakeville Station (Alternating Service)
  - Relocated Middleborough/Lakeville Station (East Taunton Transfer)
- Stoughton Alternatives
  - Standard Consists, Alternating Service
  - Diesel Multiple Unit Service
- Enhanced Commuter Bus Service

Chapter 3 of this DEIR provides a detailed comparative analysis of these alternatives, summarizing information provided in the 1997 Expanded Feasibility Study (summarized in Table 5.3-1, below). Based on this comparative analysis, the Stoughton Alternative was selected as the MBTA's preferred transportation alternative because it would have the highest ridership, resulting in the highest air quality benefits and would best meet the project's objectives. There are no substantial operational problems, and the Stoughton Alternative would be the most cost-effective alternative with the most favorable cost-per-new rider. This alternative would result in the loss of **2.X** acres of Bordering Vegetated Wetland, located within the rail right-of-way and on the former rail bed.

The Attleboro Alternative ranks second to the Stoughton Alternative with respect to ridership, air quality and transportation benefits, and its ability to meet the project's objectives. There are no substantial operational issues, and this alternative would provide a high level of cost-effectiveness. However, it traverses more highly-developed and populated areas, and would have more substantial noise impacts and a substantially higher number of at-grade crossings than the Stoughton Alternative. The Attleboro Alternative would result in the loss of **5.X** acres of Bordering Vegetated Wetland.

The Middleborough Alternative was not selected because of severe operational constraints, low ridership, and a low ability to meet the project's objectives. The MBTA's 1995 *Feasibility Study* and the February 1997 *Middleborough Line Operations Simulation*, examined service to either Fall River or New Bedford, and concluded that the Old Colony Railroad's single track north of Braintree had insufficient capacity to support the Old Colony service and trains from both Fall River and New Bedford. Only one additional train per half-hour could be scheduled along that line due to Old Colony service. Analysis indicated that no additional trains could be accommodated north of Braintree after 2000. If the Greenbush Line is not constructed, capacity along the Old Colony would be increased and may permit limited service from both Fall River and New Bedford terminal points. However, ridership on these lines is still predicted to be substantially lower than for the preferred alternative due to increased travel time and the inability to stop at the Back Bay Station. This alternative would not provide a favorable balance of costs and benefits.

Environmental impacts associated with the Middleborough Alternatives would be the same as the other alternative with regard to the New Bedford and Fall River Line south of Cotley Junction and station construction at Freetown, Fall River and New Bedford. Layover facilities would be the same as for the preferred alternative. Relocation of the existing Lakeville Station and a relocation of the East Taunton Station are required for construction of the Middleborough Alternatives.

As shown in Table 5.3-1, the Middleborough Alternatives would have a lower equipment cost and capital cost than either the Attleboro or Stoughton Alternatives. Since the Middleborough Alternatives would be extensions of the Old Colony service to Lakeville, no new train sets would be required, although additional coaches and a spare locomotive would be required for each branch. Capital costs would be lower since all of the service would be on either the existing Old Colony Line or require upgraded track currently used for freight. No new track or ROW would be constructed.

The Middleborough Alternatives were not selected due to the longer travel times, lower ridership (the Middleborough Line Alternative does not stop at Back Bay Station, nor would it capture riders at East Taunton Station or the North Easton Station). The most compelling reason for not selecting the Middleborough Line Alternative is the operational problems on the Old Colony Main Line north of Braintree. This segment of track can only accommodate a one-track system, due to limited right-of-way capacity (buildings abut the ROW which prohibits the construction of a second track). Providing additional service on the Old Colony tracks would create exposure for time delays. If a train were to become delayed or disabled on this portion of the Main Line track, it would virtually eliminate service to/from four commuter rail lines carrying over 15,000 riders (Middleborough, Plymouth, Greenbush and New Bedford/Fall River). It would not be prudent to add more trains to an already overcrowded and critical portion of the MBTA Commuter Rail System.

The Enhanced Bus Alternative was not selected, as it did not provide the best balance of costs and benefits. Although this alternative had the lowest capital and operating costs, it had substantially lower new transit ridership than either the Attleboro or Stoughton Alternatives, and also provided fewer air quality benefits due to the lower reduction in Vehicle Miles Traveled (VMTs). It does not meet the project purpose of improving the regional transportation system.

This Alternatives Analysis demonstrates that there are no alternatives that would allow the project to proceed in compliance with the performance standards of the WPA regulations.

Table 5.3-1
Comparison of Alternatives

Alternative	**Daily Ridership** (inbound boardings)	**Cost per New Rider** ($ millions)	**Operational Issues**	**Regional Transportation Capacity**	**Improved Access**
Attleboro					
Standard	3,230	$0.19	None	Enhances	Good
DMU	2,970	$0.21	None	Enhances	Good
Stoughton					
Standard	4,325	$0.13	None	Enhances	Good
DMUs	3,890	$0.14	None	Enhances	Good
Middleborough – existing Lakeville Station					
Service Extension	1,320	$0.29	Not feasible	Enhances	Fair (no Back Bay access: no Taunton Center access)
Skip/Stop-Transfer	2.045	$0.27	Not feasible without construction of new Main Line track	Enhances	Fair
Middleborough – relocated station					
Service Extension	1,410	$0.29	Not feasible	Enhances	Fair
Extension with Transfer	2,030	$0.19	Not feasible	Enhances	Fair
Enhanced Bus	3,500	$0.01	Requires South Station modification	No improvement	Fair

5.4 Mitigation Proposed

Four compensatory wetland mitigation areas have been identified in the vicinity of wetland impacts (filling) along the Stoughton Alternative, as described in Section 4.1 of this DEIR. Table 5.4-1 contains a summary of the potential wetland mitigation areas, and Figure 4.7-1 shows the approximate locations of the potential wetland mitigation areas. These areas would provide up to 3 acres of compensatory wetland area, and demonstrate that compensatory mitigation is feasible to replace lost wetlands along the Stoughton Alternative.

Additional mitigation measures are potentially feasible within the project area, and would include the identification and restoration of altered or degraded wetlands, restoration of altered Bank, and protection of upland buffers adjacent to sensitive wetlands within the Hockomock Swamp ACEC, Pine Swamp, or the Taunton River. The MBTA is committed to exploring alternative mitigation measures and strategies, in cooperation with the state and federal regulatory agencies.

Table 5.4-1
Potential Wetland Mitigation Areas

Replacement Area Number	Town	Potential Replacement Area Available (ac)
R1	Stoughton/Easton	0.5 to 1.0
R2	Easton	0.25 to 0.5
R3	Raynham	0.75 to 1.0
R4	Raynham	0.35 to 0.5
Total		**1.85 to 3.0**

Site R1 - Gravel pits west of Easton Hotel and east of ROW (Stoughton/Easton)

This area is an old borrow pit east of the railroad right-of-way and north of a forested wetland. It is accessed from Route 138 and the Easton Hotel parking lot. The area is partially vegetated by pioneer tree species (e.g. white pine, gray birch, quaking aspen) or unvegetated in some locations. This area is immediately adjacent to an approximately 4 acre forested wetland. A portion of this site has been selected as the site of the proposed North Easton Station, however, there appears to be sufficient area to construct a replacement wetland area adjacent to the station. Wetland hydrologic conditions would be achieved by grading back from the edge of the adjacent wetland and constructing the replacement area at the same elevation as the adjacent wetland. This site could provide approximately 20,000 to 40,000 square feet (approximately 0.5 to 1 acre) of replacement wetland.

Site R2 - Gravel pits west of Town of Easton Well Site (Easton)

This area is a borrow pit east of the railroad right-of-way and north of a forested wetland, similar to the R1 site. Access to the site is from Gary Road. It is approximately 600 feet west of the Town of Easton Well Number 4088000-01G. The site is unvegetated and contains exposed sand and gravel. A large forested/shrub swamp, having a perennial watercourse that flows east to Morse Pond and Queset Brook, is immediately adjacent to and south of this site. Wetland hydrologic conditions would be achieved by grading back from the edge of the forested wetland and constructing the replacement area at the same elevation as the adjacent wetland. This site could potentially provide 10,000 to 20,000 square feet (approximately 0.25 to 0.5 acres) of replacement wetland.

Site R3 - Gravel pit 1,200 feet northwest of King Philip Street (Raynham)

This borrow pit is approximately 1,200 feet northwest of the King Philip Street crossing of the railroad right-of-way within the Town of Raynham. This site can be accessed from the railroad right-of-way north of King Philip Street. The site contains approximately 30,000 square feet (0.75 acres) of unvegetated sand and gravel. The remainder of the site is forested with white pines. The adjacent forested wetland contains an overstory of red maple and a thick shrub layer containing silky dogwood, highbush blueberry (*Vaccinium corymbosum*), arrowwood (*Viburnum dentatum*), and winterberry (*Ilex verticillata*). This area is bordered by forested wetland to the north and west, and the railroad right-of-way to the east. This site could potentially provide approximately 30,000 to 40,000 square feet (0.75 to 1 acre) of replacement wetland.

Site R4 - North of auto salvage yard on East Britannia Street, south of Pine Swamp (Raynham)

This site is approximately 400 feet northeast of the East Britannia Street crossing of the railroad right-of-way, adjacent to the north side of Rose's Used Auto Parts. The site can be accessed from the salvage yard or the railroad right-of-way. This site is vegetated with scrub oak (*Quercus ilicifolia*), gray birch (*Betula populifolia*), white pine and bracken fern (*Pteridium aquilinum*). The adjacent wetland (Pine Swamp) contains forested and scrub/shrub cover types. Wetland hydrology would be achieved by grading back from the edge of the wetland and constructing the replacement area at the same elevation as the existing wetland. This site could potentially provide approximately 15,000 to 20,000 square feet (0.35 to 0.5 acres) of replacement wetland.

Although Rose's Used Auto Parts was noted as a potential hazardous materials environmental concern, there was no evidence of stained soil or stressed vegetation observed near the railroad right-of-way. In addition, the property was not listed on the database search that was conducted for the project. This site, however, would need to be scrutinized more closely for potential contamination before a wetland replacement plan for this site is developed.

6

CZM Consistency Statement

6.1 Introduction

The New Bedford/Fall River Commuter Rail project is intended to restore safe, efficient and reliable commuter rail service to the sea coast communities of Fall River and New Bedford. As described in the Environmental Notification Form (ENF) and in Chapters 2 and 3 of this Draft EIR, three alternatives have been considered to provide the desired service from Boston to Cotley Junction in Taunton. These alternatives have been considered in detail in the ENF and this Draft EIR. They include the Middleboro Alternative, the Stoughton Alternative and the Attleboro Alternative.

Between Boston and Cotley Junction, these alternatives make use of a combination of existing, active rail segments and restoration of service along currently inactive segments (Stoughton Line). South of Cotley Junction, service to Fall River and New Bedford would make use of the existing New Bedford Main Line and Fall River Secondary, which currently provide regular freight service. Portions of the Fall River and New Bedford lines in Freetown, New Bedford and Fall River are within the Massachusetts Coastal Zone as described in the regulation at 301 CMR 21.00. The portion of the project within the Coastal Zone is common to all alternatives and does not depend on any northern segment alternatives.

Work required within the Massachusetts Coastal Zone for the proposed commuter rail extension includes track and signal system upgrades within Fall River, Freetown and New Bedford, construction of a new passenger station in Fall River (Battleship Cove), a new passenger station in Freetown and new passenger stations and layover facilities in New Bedford and Fall River.

The ENF submitted in September 1995 described the project and its relationship to the Coastal Zone. In addition, the ENF contained a draft Coastal Zone Consistency Statement describing the project's consistency with federal programs. Since the filing of the ENF, the Massachusetts Coastal Zone Management Program Regulations have been revised. These revisions include a reorganization of the program policies. The current regulations include 20 Program Policies enforced by MCZM through existing Massachusetts statutes and regulations and 9 Management Principles. The Management Principles are not currently enforced by regulation but are provided as guidance.

The following section lists the Program Policies and Principles and describes how the proposed Fall River/New Bedford Commuter Rail Extension will be designed and constructed to comply with the regulatory polices and non-regulatory management principles. This consistency statement is a revision of the previous draft provided in the ENF and reflects the current format of the CZM program.

6.2 Program Policies and Principles

The program's 29 policies and principles are divided into the following 9 categories:

- water quality,
- habitat,
- protected areas,
- coastal hazards,
- port and harbor infrastructure,
- public access,
- energy,
- ocean resources, and
- growth management.

This section lists each policy and management principle as contained in the regulations at 301 CMR 21.00 and demonstrates that the project can be designed and constructed consistent with them.

6.2.1 Water Quality

Water Quality Policy #1 - Ensure that point-source discharges in or affecting the coastal zone are consistent with federally approved state effluent limitations and water quality standards.

Water Quality Policy #2 - Ensure that nonpoint pollution controls promote the attainment of state surface water quality standards in the coastal zone.

Work within the Coastal Zone will be designed and constructed to comply with federal and state effluent limitations including point source discharges. Nonpoint pollution controls will promote the attainment of state surface water quality standards.

The design and construction of the project will be subject to numerous levels of local, state and federal review. This multi-layer permitting process will help ensure that the project is constructed in accordance with these limitations.

The U.S. Environmental Protection Agency (EPA) will have the opportunity to review and comment on the project during the project during the U.S. Army Corps of Engineers' (COE) Section 10/404 permit process. This permit process is required since portions of the project including track and bridge restoration within the Coastal Zone will require temporary and permanent alterations of wetland and waterway resources. The COE review process will be limited to those parts of the project that directly alter wetland resources.

Massachusetts Department of Environmental Protection (DEP) will have the opportunity to review project activities within wetland resource areas as part of the filing of Requests for Determination (RFD) or Notices of Intent (NOI) submitted to the local conservation commission. The DEP will also review all proposed construction activities as part of the application for Water Quality Certification (WQC). Water quality certification must be obtained for this project to validate the COE permit. The COE requires a WQC to be issued by the state to document that the project does not violate state water quality standards.

All new construction will comply with the DEP Stormwater Management Policy. Redevelopment portions of the project will comply with the Stormwater Management policy to the extent practicable and will, at a minimum, improve discharge water quality. New construction within the Coastal Zone will be limited to new station construction at Fall River, Battleship Cove and New Bedford. These station sites have been shown conceptually in the ENF or in Chapter 2 of this Draft EIR. Individual station designs will be engineered as an alternative is selected and the project moves into the permitting phase.

Proposed rail operations will be consistent with federal and state effluent limitations and water quality standards in the vicinity of the tracks. Operation and maintenance of rail facilities do not discharge effluent or other materials that could result in impacts to water quality standards. Additional effluent will be generated by drainage from parking facilities at stations sites. Drainage will generally be released to the environment in the immediate vicinity of the station sites, after treatment using the best management practices (BMP) available and in conformance with the DEP Stormwater Management Policies.

Yearly vegetation maintenance along the tracks includes mechanical cutting and the use of herbicides. Herbicide use along the railroad ROW requires preparation of a 5-year Vegetation Management Plan for the track facilities and the filling of a Yearly Operation Plan on a yearly basis with the Massachusetts Department of Food and Agriculture (DFA) . These plans must consider impacts to adjacent resources and demonstrate there will be no impact to existing water quality.

Water Quality Policy #3 - Ensure that activities in or affecting the coastal zone conform to applicable state and federal requirements governing subsurface waste discharges.

Station sites will have limited water use for washing, landscape irrigation, drinking fountains and sanitary facilities. Effluent from these uses will be discharged to municipal sanitary treatment facilities, for treatment. No subsurface waste discharges are anticipated.

6.2.2 Habitat

Habitat Policy #1 - Protect coastal resource areas including salt marshes, shellfish beds, dunes, beaches, barrier beaches, salt ponds, eelgrass beds, and fresh water wetlands for their important role as natural habitats.

The proposed project will not alter any coastal resource area including salt marshes, shellfish beds, dunes, beaches, barrier beaches, salt ponds or eelgrass beds. In addition, no impacts to freshwater wetlands are proposed within the Coastal Zone.

Habitat Policy #2 - Restore degraded or former wetland resources in coastal areas and ensure that activities in coastal areas do not further wetland degradation but instead take advantage of opportunities to engage in wetland restoration.

There are no proposed wetland impacts with the Coastal Zone for the project and no restoration is required.

6.2.3 Protected Areas

Protected Areas Policy #1 - Preserve, restore, and enhance complexes of coastal resources of regional or statewide significance through the Areas of Critical Environmental Concern program.

The project does not include any work within a coastal ACEC.

Protected Areas Policy #2 - Protect state and locally designated scenic rivers and state classified scenic rivers in the coastal zone.

There are no designated scenic rivers within the project area.

Protected Areas Policy #3 - Ensure that proposed developments in or near designated or registered historic districts or sites respect the preservation intent of the designation and that potential adverse effects are minimized.

The proposed commuter rail extenson will not adversely affect any historic properties within the project area. The project will restore passenger rail service to Fall River and New Bedford via a formerly active rail corridor and is consistent with the historic context of the area.

6.2.4 Coastal Hazards

Coastal Hazard Policy #1 - Preserve, protect, restore, and enhance the beneficial functions of storm damage prevention and flood control provided by natural coastal landforms, such as dunes, beaches, barrier beaches, coastal banks, land subject to coastal storm flowage, salt marshes, and land under the ocean.

The proposed project does not include any work within coastal waterbodies or wetlands. No impacts to any natural coastal landform is anticipated.

Coastal Hazard Policy #2 - Ensure construction in water bodies and contiguous land areas will minimize interference with water circulation and sediment transport. Approve permits for flood or erosion control projects only when it has been determined that there will be no significant adverse effects on the project site or adjacent or downcoast areas.

The project does not include any work within any coastal waterbodies or coastal hazard or floodplain areas and will not interfere with water circulation or sediment transport in any coastal waterbody. The proposed rail improvements within the coastal zone are limited to the upgrade of existing track and signal systems, construction of new passenger stations in Fall River (Battleship Cove), New Bedford and Freetown. The Fall River and New Bedford stations are within previously developed areas and the Freetown Station site is approximately 4,000 feet from any coastal waterbody.

Coastal Hazard Policy #3 - Ensure that state and federally funded public works projects proposed for location within the coastal zone will:

- not exacerbate existing hazards or damage natural buffers or other natural resources,
- be reasonably safe from flood and erosion related damage, and
- not promote growth and development in hazard-prone or buffer areas, especially in Velocity zones and ACECs, and
- not be used on Coastal Barrier Resource Units for new or substantial reconstruction of structures in a manner inconsistent with the Coastal Barrier Resource/Improvement Acts.

The project does not include any work within a coastal hazard area, coastal hazard-prone or buffer area, velocity zone or coastal ACEC. The project does not require work within Coastal Barrier Resource Units and will not encourage development in these areas.

Coastal Hazard Policy #4 - Prioritize public funds for acquisition of hazardous coastal areas for conservation or recreation use, and relocation of structures out of coastal high hazard areas, giving due consideration to the effects of coastal hazards at the location to the use and manageability of the area.

The policy is not applicable to the project.

6.2.5 Port And Harbor Infrastructure

Ports Policy #1 - Ensure that dredging and disposal of dredged material minimize adverse effects on water quality, physical processes, marine productivity and public health.

The project does not include any dredging or disposal of dredged material to any coastal waterbody and will not result in adverse effects on physical processes, marine productivity or public health.

Ports Policy #2 - Obtain the widest possible public benefit from channel dredging, ensuring that designated ports and developed harbors are given highest priority in the allocation of federal and state dredging funds. Ensure that this dredging is consistent with marine environment policies.

The proposed project does not include any channel dredging.

Ports Policy #3 - Preserve and enhance the capacity of Designated Port Areas (DPAs) to accommodate water-dependent industrial uses, and prevent the exclusion of such uses from tidelands and any other DPA lands over which a state agency exerts control by virtue of ownership, regulatory authority, or other legal jurisdiction.

The proposed restoration of passenger rail service to New Bedford, and the required upgrades to the existing track and signal systems is consistent with the New Bedford and Fairhaven Harbor Plan. This plan, currently in draft form was compiled after extensive public meetings and lengthy consultation with representatives from the Coastal Zone Management Program. The Harbor Plan includes the construction of an intermodal transportation center to serve as the New Bedford passenger station for the commuter rail extension project. The proposed track upgrades will improve the existing freight capacity into New Bedford and encourage water dependent industrial uses in the port area.

A similar harbor management plan is being developed for Fall River Harbor. The *Comprehensive Municipal Harbor Plan: Report on the Harbor or Tomorrow* indicates that the extension of commuter rail service to Fall River is " generally supportive of positive change (in the DPA)". According to this report, the resumption of passenger service will present opportunities for multi-modal centers of activity bringing visitors into the central DPA. Currently, there are few opportunities in the DPA for new development, however new passenger rail facilities and improved track and signal systems will improve the ability of the area to support redevelopment options for industrial uses within the DPA.

Ports Management Principle #1 - Encourage, through technical and financial assistance, expansion of water dependent uses in designated ports and developed harbors, re-development of urban waterfronts, and expansion of visual access.

The extension of commuter rail service to Fall River and New Bedford will encourage water dependent uses in the designated port areas and both developed harbors by use of public funds for redevelopment. Upgrade of rail facilities and development of stations sites is compatible with adjacent development. This project will maintain actually improve the condition of abandoned, vacant land and convert it into a useful facility. This will not only maintain but enhance existing community character and scenic resources.

6.2.6 Public Access

Public Access Policy #1 - Ensure that developments proposed near existing public recreation sites minimize their adverse effects.

Public Access Management Principle #1 - Improve public access to coastal recreation facilities and alleviate auto traffic and parking problems through improvements in public transportation. Link existing coastal recreation sites to each other or to nearby coastal inland facilities via trails for bicyclists, hikers, and equestrians, and via rivers for boaters.

Redevelopment of commuter rail facilities in Fall River and New Bedford will provide mass transit access to coastal recreational facilities. A station in Fall River is planned to directly service Battleship Cove. Commuter rail service between these coastal areas and Boston will help to alleviate commuter automobile traffic and parking problems. The developed nature of the coastal areas in project area are not suitable for trail development. The rail embankment does not have sufficient width to incorporate a trail system, and the proximity to high speed rail traffic would raise safety questions. The use of existing, active rail segments within the Coastal Zone does not preclude development of any proposed public access paths.

Public Access Management Principle #2 - Increase capacity of existing recreation areas by facilitating multiple use and by improving management, maintenance and public support facilities. Resolve conflicting uses whenever possible through improved management rather than through exclusion of uses.

Public Access Management Principle #3 - Provide technical assistance to developers of private recreational facilities and sites that increase public access to the shoreline.

This Management Principle is not applicable to the proposed project.

Public Access Management Principle #4 - Expand existing recreation facilities and acquire and develop new public areas for coastal recreational activities. Give highest priority to expansions or new acquisitions in regions of high need or limited site availability. Assure that both transportation access and the recreational facilities are compatible with social and environmental characteristics of surrounding communities.

This Management Principle is not applcable to the proposed project.

6.2.7 Energy

Energy Policy #1 - For coastally dependent energy facilities, consider siting in alternative coastal locations. For non-coastally dependent energy facilities, consider siting in areas outside of the coastal zone. Weigh the environmental and safety impacts of locating proposed energy facilities at alternative sites.

This policy is not applicable to the proposed project.

Energy Management Principle #1 - Encourage energy conservation and the use of alternative sources such as solar and wind power in order to assist in meeting the energy needs of the Commonwealth.

The proposed project will support this Management Principle by encouraging the use of public transportation and reducing dependency on individual automobiles. This project will not provide the opportunity to use alternative energy sources such as wind or solar power.

6.2.8 Ocean Resources

Ocean Resources Policy #1 - Support the development of environmentally sustainable aquaculture, both for commercial and enhancement (public shellfish stocking) purposes. Ensure that the review process regulating aquaculture facility sites (and access routes to those areas) protects ecologically significant resources (salt marshes, dunes, beaches, barrier beaches, and salt ponds) and minimizes adverse impacts upon the coastal and marine environment.

This policy is not applicable to the proposed project.
Ocean Resources Policy #2 - Extraction of marine minerals will be considered in areas of state jurisdiction, except where prohibited by the MA Ocean Sanctuaries Act, where and when the protection of fisheries, air and marine water quality, marine resources, navigation and recreation can be assured.

This policy is not applicable to the proposed project.

Ocean Resources Policy #3 - Accommodate offshore sand and gravel mining needs in areas and in ways that will not adversely affect shorelines areas due to alteration of wave direction and dynamics, marine resources and navigation. Mining of sand and gravel, when and where permitted, will be primarily for the purpose of beach nourishment.

This policy is not applicable to the proposed project.

6.2.9 Growth Management

Growth Management Principle #1- Encourage, through technical assistance and review of publicly funded development, compatibility of proposed development with local community character and scenic resources.

The proposed restoration of commuter rail service to Fall River and New Bedford is compatible with the local character and scenic resources and Harbor Master Plan.

Growth Management Principle #2 - Ensure that state and federally funded transportation and wastewater projects primarily serve existing developed areas, assigning highest priority to projects that meet the needs of urban and community development centers.

This transportation project will serve developed areas of Fall River and New Bedford, and link these areas with other major metropolitan areas such as Boston, Attleboro, and Taunton.

Growth Management Principle #3 - Encourage the revitalization and enhancement of existing development centers in the coastal zone through technical assistance and federal and state financial support for residential, commercial and industrial development.

This policy is supported by the project since high speed mass transit service to Fall River and New Bedford will encourage redevelopment. Commercial and industrial development and redevelopment within these cities will benefit from the re-establishment of rail mass transit. Mass transit will provide workers a larger geographic area of potential employment. In addition, the access to distant locations provided by the project will create opportunity for new residential development in Fall River and New Bedford.

6.3 Summary

The Fall River/New Bedford Commuter Rail Project complies with the policies and principles of the Massachusetts Coastal Zone Management Program. Redevelopment of the existing rail corridors will minimize impacts to natural and cultural resources within the Coastal Zone while providing modern public transportation facilities to two economically challenged sea coast communities. The rehabilitation of station sites within the coastal zone and restoration of passenger service to Fall River and New Bedford will encourage redevelopment within the Fall River and New Bedford Designated Port Areas. The project is consistent with the goals of the draft Harbor Plans currently being finalized for these areas and will improve public access to the waterfront increasing usage of coastal recreation and industrial uses.

7

Draft Section 61 Finding

This chapter of the Draft EIR provides a draft Section 61 Finding for the New Bedford/Fall River Commuter Rail Extension.

7.1 Introduction

These Section 61 Findings for the proposed New Bedford/Fall River Commuter Rail Extension have been prepared to comply with the requirements of Massachusetts General Laws, Chapter 30, Section 61. M.G.L. c.30, s.61 requires state agencies and authorities to review, evaluate and determine the impacts on the natural environmental of all projects or activities requiring permits issued by the state, and to issue findings describing the environmental impacts, if any, and certifying that all feasible measures have been taken by the project proponent to avoid or minimize these impacts. As described below, the Massachusetts Bay Transportation Authority (MBTA) has reviewed the environmental effects of the proposed reconstruction of railroad track between Stoughton and New Bedford and Fall River and the construction of new commuter rail stations and layover facilities. Following that review, the MBTA finds below that all feasible measures have been taken first to avoid and then to minimize those effects.

7.2 Project Description

The New Bedford/Fall River Commuter Rail Extension project was developed with the ultimate goal of providing a safe, efficient and reliable commuter rail service for southeast Massachusetts, from Boston to the seaport communities of New Bedford and Fall River (Figure 1.4-1). Prior to 1958, these rail lines were part of the Old Colony Railroad System which provided service to these communities from Boston's South Station, via Canton Junction, along the Stoughton Branch railroad. Since discontinuation of this service, commuter rail has only been available to southeastern Massachusetts along the Boston-Providence Shore Line, with stops in Attleboro and South Attleboro, and the Old Colony Middleborough Line which terminates in Lakeville. However, none of these projects provide an opportunity for commuters from the Fall River or New Bedford areas to easily or efficiently access rail transportation to Boston. Several southeast Massachusetts communities and agencies have proposed re-establishing commuter rail service to relieve traffic congestion, improve transportation infrastructure, and stimulate economic growth through an improved and reliable public transportation system linking major metropolitan areas. In July 1995, Governor Weld made a commitment to provide commuter rail service to New Bedford and Fall River. This commitment continues with the Cellucci Administration.

The project will provide commuter rail service from Boston's South Station to New Bedford and Fall River. The Stoughton Alternative, presented in this Draft EIR as the MBTA's preferred transportation alternative, includes stops at the existing Back Bay, Canton Junction, and Stoughton stations, and at new stations located in North Easton, Raynham, Taunton (Dean Street), East Taunton, Freetown, Fall River, Battleship Cove (Fall River), and New Bedford. Layover facilities would be constructed in Fall River and New Bedford, as described in the ENF. This alternative would use existing commuter rail tracks from South Station to the Stoughton Station; would require the reconstruction of 14 miles of commuter rail along an inactive rail right-of-way from Stoughton to north of Winter Street in Taunton (including acquiring the disused right-of-way from 17 current private property owners); and would use 2 miles of active freight rail lines from Winter Street to Ingell Street in Taunton. Upgrading and rehabilitating existing active freight track from Ingell Street (Weir Junction) to the terminal stations in Fall River and New Bedford will be required, as described in the ENF (Figure 1.4-2).

The Stoughton Alternative is projected to serve 4,325 commuter rail patrons per day, with 20 daily round-trips to Fall River and to 20 daily round trips to New Bedford. The estimated travel time from New Bedford to South Station is approximately 1 hour and 15 minutes.

7.3 History of MEPA Review

An Expanded Environmental Notification Form (ENF) was submitted to the Executive Office of Environmental Affairs in September, 1995 and was assigned EOEA No. 10509. This ENF provided a detailed evaluation of the environmental impacts, infrastructure improvements, commuter rail stations, layover facilities and operations of the New Bedford/Fall River Commuter Rail system. The ENF also provided a summary of the alternatives analyzed in the MBTA's 1990 and 1995 feasibility reports, and identified the Attleboro Alternative as the MBTA's preferred alternative. The ENF proposed a special review process that would require preparation and submittal of a Draft and Final Environmental Impact Report for the construction of commuter rail along a new alignment in Attleboro and that would respond to comments on the ENF, but that would not require further MEPA review of improvements to the existing rail infrastructure or station construction other than information required to respond to comments.

The Secretary's Certificate on the ENF, issued on December 7, 1995, found that the ENF "forms a substantial base for evaluating the proposed project [but] there are a number of issues that require further elaboration in the Draft EIR." Specific requirements for this DEIR included:

- Additional analysis of alternatives, particularly to determine if the Middleborough Alternative is practicable, or if operational or equipment alternatives could reduce the number of trips between Myricks and Boston to reduce impacts on residential neighborhoods and operations of the Shore Line.
- No further MEPA wetland review was required for the reconstruction of existing tracks, construction of stations, or construction of layover facilities. The Secretary determined that these issues were adequately addressed in the ENF and would be the subject of Conservation Commission filings.
- Additional information and detail on the construction of new railroad through wetlands, with respect to wetland impacts, vegetation clearing, and mitigation;
- A complete request for a Variance, including analysis of alternatives, explanation of environmental benefits and detriments of each, and detailed information on mitigation;
- Information required by the Massachusetts Natural Heritage and Endangered Species program to determine adverse impacts to state-listed rare species, avoidance or minimization of impacts, and provision of wildlife corridors;
- Additional traffic analysis for the East Taunton station; the Tarkiln Road crossing in New Bedford; and traffic impacts and alternative station locations in Freetown;
- Potential impacts of increased nitrogen oxide (Nox) emissions; and
- Information required by the Massachusetts Historic Commission to assess potential impacts to historic resources.

In addition, the Secretary requested that the MBTA consider impacts to property values, quality of life, and socioeconomic issues, as well as the cost/benefit and financial feasibility of providing commuter rail service to New Bedford and Fall River.

Due to public concerns received during the ENF, in 1996, the Massachusetts State Legislature directed the MBTA to prepare an Expanded Feasibility Study, which evaluated all viable alternative routes for extending commuter rail service to both New Bedford and Fall River via the Attleboro, Stoughton and Middleborough railroad corridors. The report concluded that the Stoughton Alternative would attract the highest ridership, have the least environmental impacts and represent the most cost-effective commuter rail alternative. As a result, the MBTA is currently preparing a Draft Environmental Impact Report (DEIR) which compares the Attleboro Line and the Stoughton Line and undertaking 10 percent preliminary engineering design for the Stoughton alignment to adequately compare both alternatives. The Middleborough Line alternative is not considered to be a viable alternative due to low ridership, increased travel time and operational constraints on the Old Colony Main Line north of Braintree, based on the 1997 *Expanded Feasibility Study*.

The MEPA Certificate and the State Legislature recognize that minimal impacts occur South of Cotley Junction in Taunton, therefore, the MBTA was directed to proceed with final design activities. As part of the design efforts for the project, the MBTA has recently completed the South Coast Bridge Contract. It was bid and awarded in September 1998, and is currently under construction. This one-year construction contract involves the complete replacement of four bridge superstructures which are owned by CSX (formerly Conrail) and the rehabilitation of one state highway bridge on the Fall River Secondary. The MBTA is currently completing final design for the replacement of three bridges in New Bedford. This contract is expected to be bid in late fall, 1999.

7.4 Related Permits and Approvals

The New Bedford/Fall River Commuter Rail extension will require permits and approvals from several state and federal agencies. Table 7.4-1, below, lists the permits and approvals that are anticipated.

Table 7.4-1
Permits and Approvals

Permit/Approval	Agency
MA Wetlands Protection Act Variance	MA DEP
Order of Conditions	Stoughton Conservation Commission
	Easton Conservation Commission
	Raynham Conservation Commission
	Taunton Conservation Commission
	Freetown Conservation Commission
	Lakeville Conservation Commission
	New Bedford Conservation Commission
	Fall River Conservation Commission
Sect. 401 Water Quality Certification	MA DEP
Section 404 Permit	US Army Corps of Engineers
Massachusetts Endangered Species Act – Conservation Permit	MA Division of Fisheries, Wildlife and Law Enforcement
Coastal Zone Management Consistency Review	MA CZM
NPDES Construction Permit	US EPA
Massachusetts Historic Act Review	Massachusetts Historic Commission
National Historic Preservation Act (Section 106) Review	Massachusetts Historic Commission
Chapter 91 License	MA DEP

7.5 Overview of Project Impacts and Mitigation Measures

The Draft EIR demonstrated that the environmental impacts of the proposed commuter rail extension are unavoidable, have been minimized to the greatest extent practicable, and are amenable to mitigation. The following paragraphs describe, by type of effect, the impacts anticipated and the strategies to be employed to minimize or mitigate for those impacts.

Standard, careful construction practices will be used for all work on this project and, when combined with the specific mitigation measures listed below, will limit both short- and long-term environmental effects.

7.5.1 Wetlands

The project alignment and station locations were carefully selected to avoid and minimize wetland impacts. Special construction methods will be used in sensitive areas (the Hockomock Swamp ACEC and Pine Swamp) to avoid placing fill in significant wetlands, and stringent erosion control and sedimentation measures will be used throughout the project to avoid construction impacts to wetland resources.

The project will result in unavoidable impacts to approximately 2.5 acres of bordering vegetated wetland. These filled wetlands have developed within the railroad right-of-way as a result of lack of maintenance since commuter rail service was terminated. These wetlands are generally of low functional value. The MBTA will provide compensatory wetland mitigation areas within the same watershed as the lost areas, at a mitigation ratio greater than 1:1. Review by the Department of Environmental Protection and local Conservation Commissions will ensure that the project is conditioned to protect the ability of the adjacent wetlands to provide the significant interests identified in the Wetlands Protection Act.

7.5.2 Water Quality

The New Bedford/Fall River Commuter Rail extension is not anticipated to affect surface or ground water quality. Each of the commuter rail stations will be designed in compliance with the Massachusetts Stormwater Policy, and will incorporate structural and operational best management practices to mitigate any potential impacts to water quality.

7.5.3 Biological Diversity

Construction of the Stoughton Branch portion of the New Bedford/Fall River Commuter Rail Extension is likely to affect migratory, nesting, and reproductive habitat of three state-listed rare species. Impacts to the habitat and populations of other wildlife species are expected to be minimal, and to be restricted to areas directly adjacent to the tracks. The MBTA will develop detailed Conservation Plans for each of the affected rare species, which will incorporate measures designed to mitigation for any direct impacts or habitat loss and to provide a net long-term benefit to the local population of each species. Safe wildlife crossings will be developed and implemented in key locations to facilitate the passage of small mammal, amphibian and reptile species across the railroad right-of-way.

7.5.4 Traffic

Increased local traffic associated with access to commuter rail stations may result in a decrease in operational efficiency at local intersections, particularly in North Easton, Raynham, and Freetown. The MBTA will provide intersection improvements, including traffic signals and turning lanes, as required to mitigate the effects of commuter rail station traffic increases.

7.5.5 Air Quality

The project will provide a regional air quality benefit with respect to emissions of carbon monoxide (CO) and volatile organic compounds (VOCs), and will result in substantial decreases in emissions by reducing automobile trips. The project will result in minor increase of nitrogen oxides (NOx). This increase, however, will not have an adverse effect on regional air quality, water quality, and will not exceed any state or federal standards.

7.5.6 Noise and Vibration

Commuter rail service using the Stoughton Alternative will result in severe noise impacts to 147 residences or businesses along the New Bedford/Fall River Commuter Rail Extension, and moderate impacts to an additional 400 receptors. These impacts result from the proximity of buildings to the tracks and grade crossings. No adverse noise impacts are anticipated for the two layover facilities due to their location in urban areas adjacent to existing transportation facilities. The MBTA has committed to completing a detailed Noise Mitigation Implementation Plan that will identify noise-sensitive areas that will experience noise impacts, and will develop a mitigation implementation schedule. Mitigation measures, including noise barriers and soundproofing, will be implemented where these are found to be practicable and effective.

Construction noise impacts will be mitigated through construction scheduling to avoid particularly noisy work at night; by incorporating noise guidelines into construction documents; and by developing specific noise control measures and specifications during the final design process.

Vibration may affect as many as 215 residences or businesses along the commuter rail line between Stoughton and the terminal cities of New Bedford and Fall River. The majority of these impacts occur along densely populated areas where receptor locations are near the proposed rail corridor. These effects will be noticeable, but in no case will they approach the limits at which damage to structures might occur. The MBTA is committed to investigating potential vibration effects and mitigation as part of the Noise Mitigation Implementation Plan. The MBTA will review the train passby speeds along the vibration-sensitive areas. Where train speed reductions are not feasible, the use of vibration isolating and absorbing devices, such as ballast mats, will be investigated. Other source controls, such as careful maintenance of MBTA passenger car and locomotive wheels and frequent rail truing and ballast repairs, may be effective in reducing vibration. The MBTA will develop a rigorous maintenance program for rolling stock and rail to mitigate for any unavoidable vibration impacts.

7.5.7 Cultural Resources

None of the historic structures inventoried as part of the ENF or Draft EIR will be affected in any way by the railroad right-of-way, commuter rail stations, or layover facility construction. No areas of archaeological sensitivity will be affected. The MBTA is committed to providing vibration protection, as needed, for historic structures in close proximity to the tracks, and to on-going coordination with the Massachusetts Historical Commission.

7.5.8 Hazardous Materials

The MBTA has identified potential sources of soil contamination adjacent to the railroad right-of-way in several locations, and has identified and characterized hazardous materials present at the proposed New Bedford and Fall River commuter rail station sites. The MBTA is committed to undertaking further investigations to characterize environmental and human health risks at these sites, and to undertaking remediation as required to mitigate for risks. The MBTA will undertake further investigations at potential sites along the right-of-way to ensure that any soil disturbance during construction will be in compliance with applicable state regulations.

7.6 Mitigation Summary

The MBTA is committed to providing mitigation, where practicable, to mitigate or compensate for unavoidable impacts. Table 7.6-1, below, outlines the MBTA's mitigation commitments as described in this DEIR. Specific mitigation measures, and an implementation schedule, will be determined and designed during subsequent design process and will be identified in the Final EIR.

Table 7.6-1
Mitigation Measures

Impact Type	Mitigation Commitment
Wetland impacts	Provide full compensatory mitigation for all loss of wetland area; provide mitigation for loss of wetland functions
Water Quality	Utilize appropriate BMPs for construction erosion and sedimentation control Implement spill control program during construction Use approved vegetation management plan for ROW maintenance Design and operate stations in compliance with DEP Stormwater Policy
Wildlife/Rare Species	Provide wildlife underpasses/tunnels as practicable Prepare conservation plans for affected rare species, to minimize impacts and provide long-term net benefits to the local populations
Traffic	Improve intersections of Route 138 in Easton at Main Street, Route 123, Union Street, and Elm Street Improve intersection of Route 138 and Foundry Street in Raynham Improve intersection of Ridge Hill Road and South Main Street in Freetown
Noise and Vibration	Develop noise mitigation implementation plan: implement noise barriers, soundproofing, and vibration isolation/absorbing devices as practicable
Historical Properties	Monitor and mitigation potential vibration impacts at North Easton Old Colony Station
Hazardous Materials	Conduct Phase I Site Assessment at Raynham and Dean Street Stations: remediate contaminated areas as appropriate.
Safety	Install and maintain best available grade crossing protection devices Implement safety training and education programs in local schools and communities Construct bypass roadway in Stoughton south of Morton Street to protect safe driveway access

7.7 Findings

The MBTA finds, as required by Massachusetts General Laws, Chapter 30, Section 61, that all feasible measures have been taken to avoid and minimize the environmental impacts of the New Bedford/Fall River Commuter Rail Extension.

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Distribution

Federal Agencies

US Army Corps of Engineers

US Environmental Protection Agency

US Fish and Wildlife Service

Federal Transit Administration - Regional Office

US Department of Transportation (Federal Railroad Administration)

State Agencies

Executive Office of Environmental Affairs
- Secretary
- MEPA Unit
- Massachusetts Coastal Zone Management

Department of Environmental Protection
- Division of Wetlands and Waterways
- Division of Water Pollution Control
- Division of Air Quality Control
- Division of Hazardous Waste
- Department of Environmental Protection - Southeastern Regional Office

Department of Food & Agriculture

Department of Environmental Management
- Division of Resource Conservation
- ACEC Program
- Region 1 Forests and Parks

Department of Public Utilities

Executive Office of Transportation & Construction
- Executive Director, MBTA Advisory Board
- State Transportation Library

Massachusetts Highway Department, Boston
Massachusetts Highway Department, District 5

Massachusetts Historical Commission

Division of Fisheries and Wildlife
- Natural Heritage and Endangered Species Program

Regional Agencies

Greater Attleboro/ Taunton Regional Transit Authority (GATRA)

Southeastern Regional Planning & Economic Development District (SERPEDD)

Metropolitan Area Planning Council (MAPC)

Old Colony Planning Council

Cape Cod Regional Planning and Economic Development District

Southeastern Regional Transit Administration (SRTA)

Central Transportation Planning Staff (CTPS)

Municipalities

Attleboro

Mayor Judith Robbins
Conservation Commission
Planning Board
Public Library

Berkley

Board of Selectmen
Conservation Commission

Planning Board
Public Library

Canton

Board of Selectmen
Conservation Commission
Planning Board
Public Library

Easton

Board of Selectmen
Conservation Commission
Planning Board
Public Library

Fall River

Mayor Edward Lambert
Director-Economic Development Commission
Conservation Commission
Planning Board
Public Library

Freetown

Board of Selectmen
Conservation Commission
Planning Board
Public Library

Lakeville

Board of Selectmen
Conservation Commission
Planning Board
Public Library

Mansfield

Board of Selectmen
Conservation Commission
Planning Board

Public Library

New Bedford

Mayor Frederick Kalisz
Conservation Commission
Department of Public Works
Planning Department
Public Library

Norton

Board of Selectmen
Conservation Commission
Planning Department
Public Library

Raynham

Board of Selectmen
Conservation Commission
Planning Department
Public Library

Sharon

Board of Selectmen
Conservation Commission
Planning Department
Public Library

Stoughton

Board of Selectmen
Conservation Commission
Planning Department
Public Library

Taunton

Mayor Robert G. Nunes
Conservation Commission
Department of Public Works
Planning Department

Public Library

State and Federal Elected Officials

U.S. Senators

Edward Kennedy
John Kerry

Members of U.S. House of Representatives

John J. Moakley
James P. McGovern
Barney Frank

State Senators

Robert Havern
Joanne Sprague
Marc Montigny
Thomas C. Norton
Marc Pacheco
Cheryl Jacques
Robert Creedon

State Representatives

Antonio Cabral
Joseph Sullivan
Robert Correia
James Fagan
David B. Sullivan
Barbara Hyland
Robert Koczera
Michael Rodrigues
John Lepper
David Flynn
George Rogers
Joan Menard
Elizabeth Poirier
John Quinn
William Straus
Philip Travis
Geraldine Creedon

Louis L. Kafka
William C. Galvin

Private Organizations

Private Bus Operators

American Eagle Motor Coach
Bonanza Bus Lines, Inc.
H.& L. Bloom Bus Line
Howard Bus, Co.
Southeastern Massachusetts Private Carrier Association (SEMPCA)

Private Rail Operators

CSX
Amtrak
Bay Colony

Miscellaneous

Association for Public Transportation, Inc.
Bicycle Coalition of Massachusetts
Citizens Concerned About Tracks (CCATS)
Conservation Law Foundation
Fall River Area Chamber of Commerce
Massachusetts Association of Conservation Commissions
Portugese-American Business Association, Inc.

Others

An Executive Summary of the DEIR and notice of availability will be distributed to all residents who submitted comments on the ENF.

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